GRANULAR AGGREGATE RESOURCES, WATERFORD (NTS 21 H/11)

and SALMON RIVER (NTS 21 H/6) MAP AREAS, NEW BRUNSWICK

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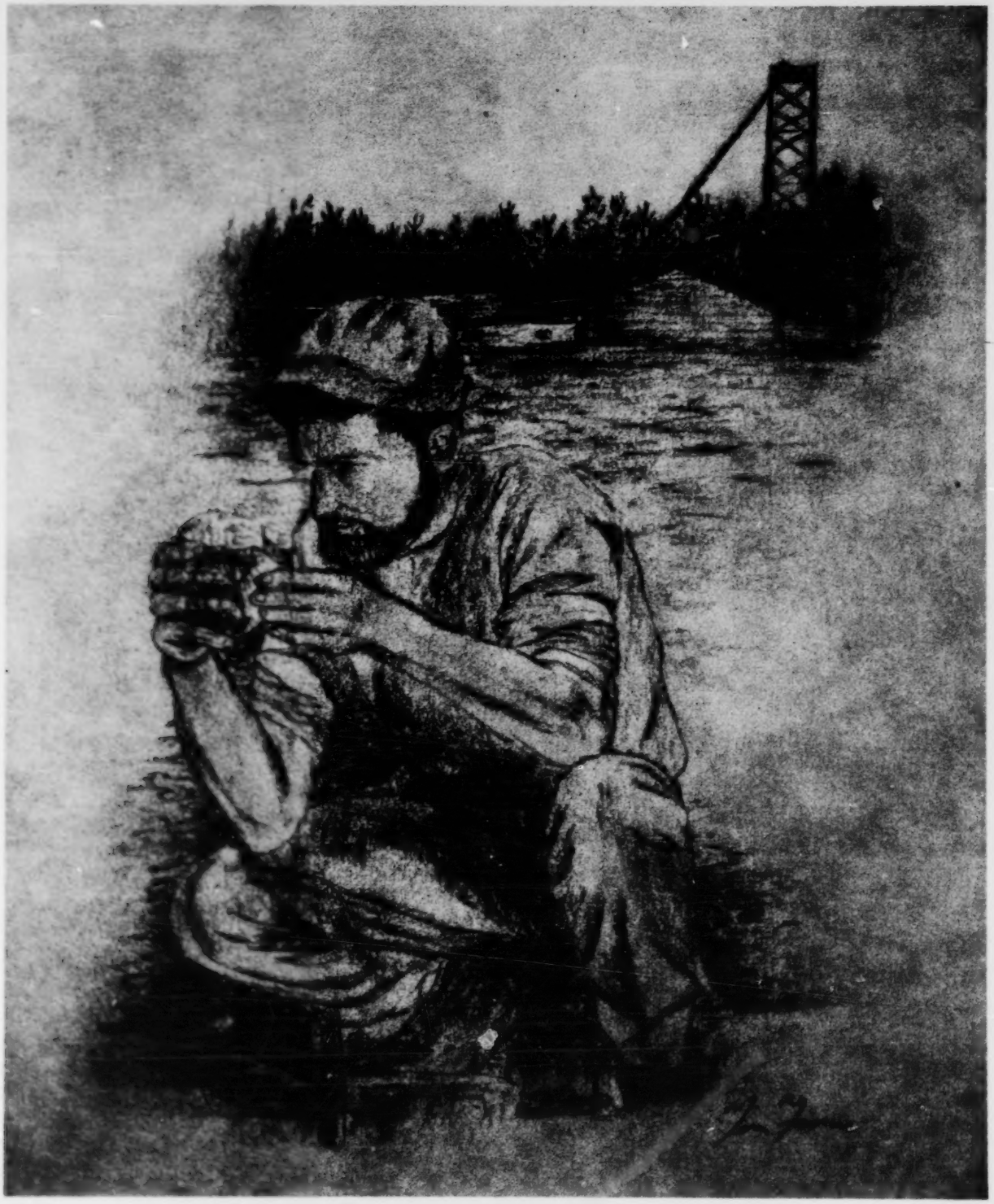

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Minerals and Energy Division
Department of Natural Resources and Energy
New Brunswick

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Plate 87-1. Granular Aggregate Resources of Salmon River, 21 H/6 ..... in pocket
87-2. Granular Aggregate Resources of Waterford, 21 H/11 ..... in pocket

ABSTRACT

The Waterford and Salmon River map areas contain an estimated 52 million m^3 of workable granular aggregate materials. Approximately three-quarters of this material lies in ice-contact stratified drift and glaciofluvial outwash deposits in the valleys of Big Salmon River and its tributaries, and is as yet little exploited.

The quality of the material in the area varies from poor to very good. Most of the material in the Big Salmon River deposits is fair- to good-quality coarse aggregate.

RÉSUMÉ

La région couverte par les feuillets topographiques Waterford et Salmon River contient un volume extractible d'agrégat granulaire estimé à 52 x 10^6 m^3. Environ trois quarts de ce matériel est situé dans les dépôts juxta-glaciaires et d'épandange fluvioglaciaire des vallées de la rivière Big Salmon et de ses tributaires. Jusqu'à maintenant, on a peu exploité ces dépôts.

La qualité de l'agrégat varie de pauvre à très bonne. La grande partie du matériel contenu dans la vallée de la rivière Big Salmon est un agrégat grossier de qualité allant de passable à bonne.

INTRODUCTION

LOCATION AND ACCESS

The Waterford (21 H/11) and Salmon River (21 H/6) map areas are located in southeastern New Brunswick, approximately midway between Saint John and Moncton (Figure 1). They comprise a total land area of 1198 km^2, lying between longitudes 65°00'W and 65°30'W, and latitude 45°45'N and the Bay of Fundy coast (Figure 2). The village of Sussex Corner is the major community within the area. The area also includes a large part of Fundy National Park.

The Trans-Canada Highway (Highway 2) passes through the northwestern corner of the area. Highways 111 and 114 and a network of local roads and logging roads provide good access throughout most of the area. With the exception of a few deposits along the Bay of Fundy coast, all significant granular aggregate deposits are readily accessible.

PREVIOUS WORK IN THE AREA

Aspects of the surficial geology of the study area were described by Mathew (1879) and Chalmers (1885, 1890) in their early works on the surficial geology of southern New Brunswick. The surficial geology of the area has since been mapped at the regional scale (1:250 000) by Rampton and Paradis (1981). In addition, the village of Sussex Corner has been mapped in detail (McCutcheon and Thibault 1981), as has the one

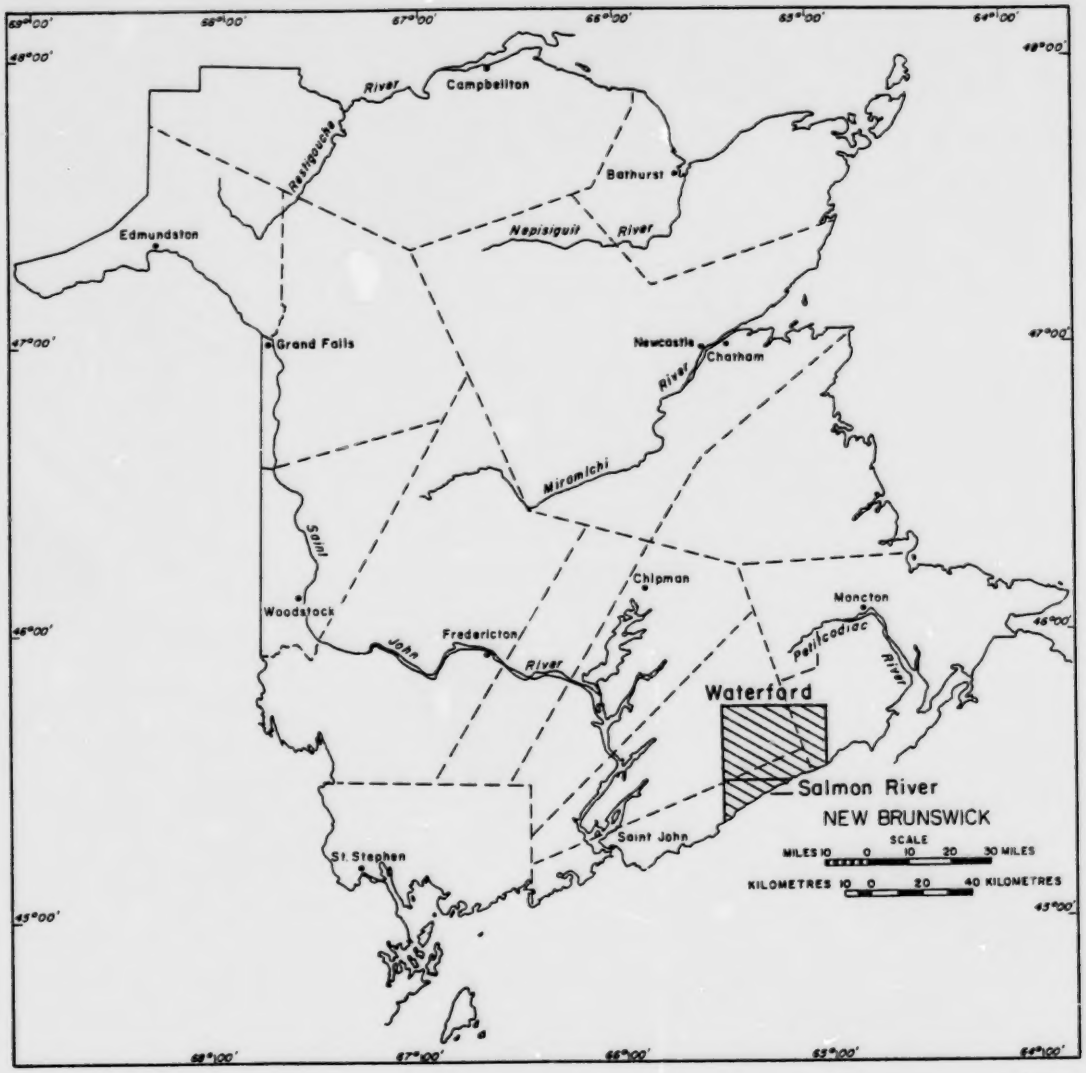

FIGURE 1. Location of the Waterford (21 H/11) and Salmon River (21 H/6) map areas.

to two kilometre wide strip of land flanking the Bay of Fundy (Hunter and Associates 1982). Greiner (1974) has described the geomorphology in Fundy National Park, including the glacial geology. The soils of the area, with associated information on surficial geology, were described by Aalund and Wicklund (1950). The results of the above studies have been compiled and summarized by Rampton et al. (1984).

Information on some of the aggregate extraction sites in the study area was provided by Hamilton and Carroll (1975) in their preliminary survey of the sand and gravel resources of the province. Detailed information on one of the deposits in the Salmon River map area is presented by Finamore and Lohse (1977). Their information is incorporated in this report, along with additional information from Finamore's field notes.

THE PRESENT STUDY

The objective of this study is to provide basic information pertaining to the location, extent, thickness, and quality characteristics of the granular aggregate deposits in the Waterford and Salmon River map areas. It is part of a province-wide inventory of granular aggregate resources.

Field work was carried out during four weeks in the summer of 1985 and two weeks in the summer of 1986. All driveable roads outside of Fundy National Park were surveyed. The park area was not mapped since it lies outside of Provincial jurisdiction (for information on the surficial deposits within

the park, refer to Greiner 1974). All known accessible aggregate excavations were examined and described. Samples for textural and lithologic analysis were obtained from representative sites.

The granular aggregate deposits and site locations are plotted on the accompanying maps (Plate 87-1, Salmon River; Plate 87-2, Waterford). Detailed descriptions of the sampled sites are contained in the Appendices. These descriptions are accompanied by the sample analyses for these locations, available test data from the New Brunswick Department of Transportation (DOT), general comments pertaining to the deposits as a whole, and estimates of the workable reserves. Supplementary observations pertaining to sites or deposits of lesser significance follow the detailed descriptions.

ACKNOWLEDGEMENTS

Capable field assistance was provided by William T. Bourque (1985) and Christina L. McLellan (1986). They also conducted the pebble lithology analyses. The samples for textural analysis were processed by the New Brunswick Department of Transportation Central Laboratory (samples collected in 1985) and by ADI Limited (samples collected in 1986). The report was typed by Diane Blair. The figures were drafted by Gerry Johnson, and the maps by Vanderklift Exploration Services. The report, maps, and figures were edited by Shasta A. Abbott.

PHYSIOGRAPHY AND GEOLOGY

PHYSIOGRAPHY

Physiographic Units: The Waterford and Salmon River map areas lie in the Caledonian Highlands physiographic unit of Rampton et al. (1984). This unit is an area of complex geology and geomorphology, comprising a central plateau of resistant Precambrian rocks flanked by boundary areas of folded and faulted Carboniferous rocks (Rampton et al. 1984). Elements of three subdivisions of the Highlands lie within the study area (Figure 2); the Central Plateau, the Anagance Ridges, and the Mispec Plateau.

The Central Plateau is a rolling, plateau-like, upland surface with scattered hilltops and prominent, deep and narrow valleys cut by fast-flowing streams (Aalund and Wicklund 1950; Bird 1972; Kindle 1962; Rampton and Paradis 1981). It comprises part of the Fundy Surface (Bird 1972), peneplaned in post-Carboniferous time (Kindle 1962). Relief is in the order of 60 to 90 m, except near the coast where it locally reaches 270 m (Rampton and Paradis 1981). The coast is rugged, consisting of nearly continuous, precipitous, sheer-rock bluffs 150 to 240 m high (Aalund and Wicklund 1950; Kindle 1962; Rampton and Paradis 1981).

The Anagance Ridges subdivision is an area of valley-and-ridge topography to the north of the Central Plateau. The valleys and ridges, parallel to the regional structural trend,

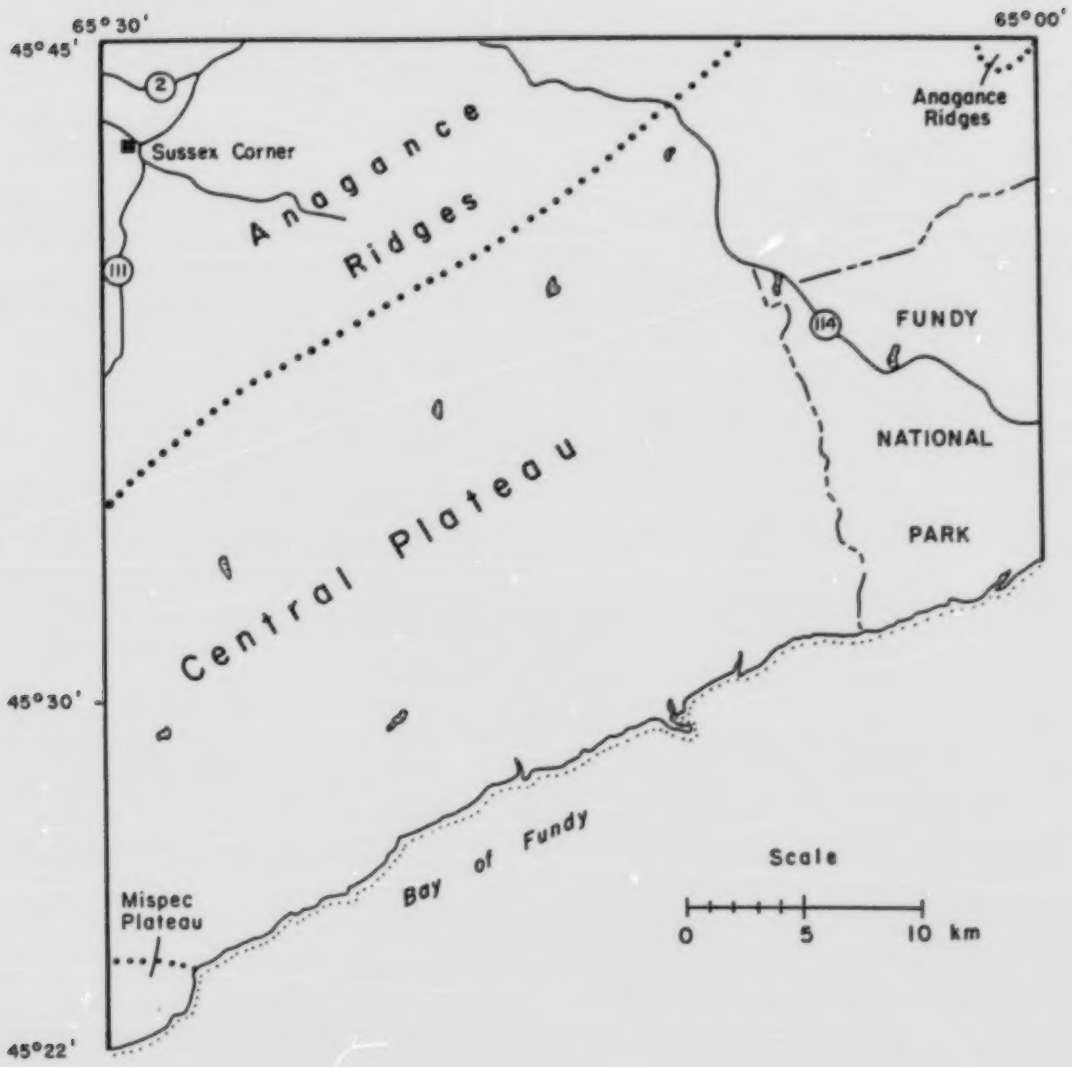

FIGURE 2. Physiographic units of the Waterford and Salmon River map areas (from Rampton et al. 1984).

were developed by the erosional denudation of the underlying folded and faulted bedrock (Bird 1972; Rampton et al. 1984). Relief is in the order of 100 to 200 m.

The Mispec Plateau is an undulating highland that forms an intermediate level bench between the western part of the Central Plateau and the Bay of Fundy (Rampton et al. 1984). Local relief is generally less than 60 m, and the coastal cliffs are less than 100 m in height.

Drainage: The study area lies within three primary drainage basins (Figure 3). The northwestern corner of the area lies in the Saint John River drainage basin, and is drained toward the west via the Hammond and Kennebecasis rivers and Trout Creek. Part of the northeastern corner of the area lies within the Petitcodiac River drainage basin, and drains toward the north via the Pollett River. The remainder of the area lies within the Bay of Fundy drainage basin, and drains toward the south via a number of small rivers and brooks, the most significant of which are the Big Salmon, Little Salmon, Quiddy, and Point Wolfe rivers.

Most of the study area is moderately well to well drained; the primary exceptions are the broad, drift-filled valleys in the Anagance Ridges (Rampton and Paradis 1981). The streams radiate from the highest part of the Central Plateau, near Pleasant Lake. Most of them exhibit a dendritic drainage pattern, though local areas of glacial derangement are evident. At the edge of the plateau, they are deeply incised

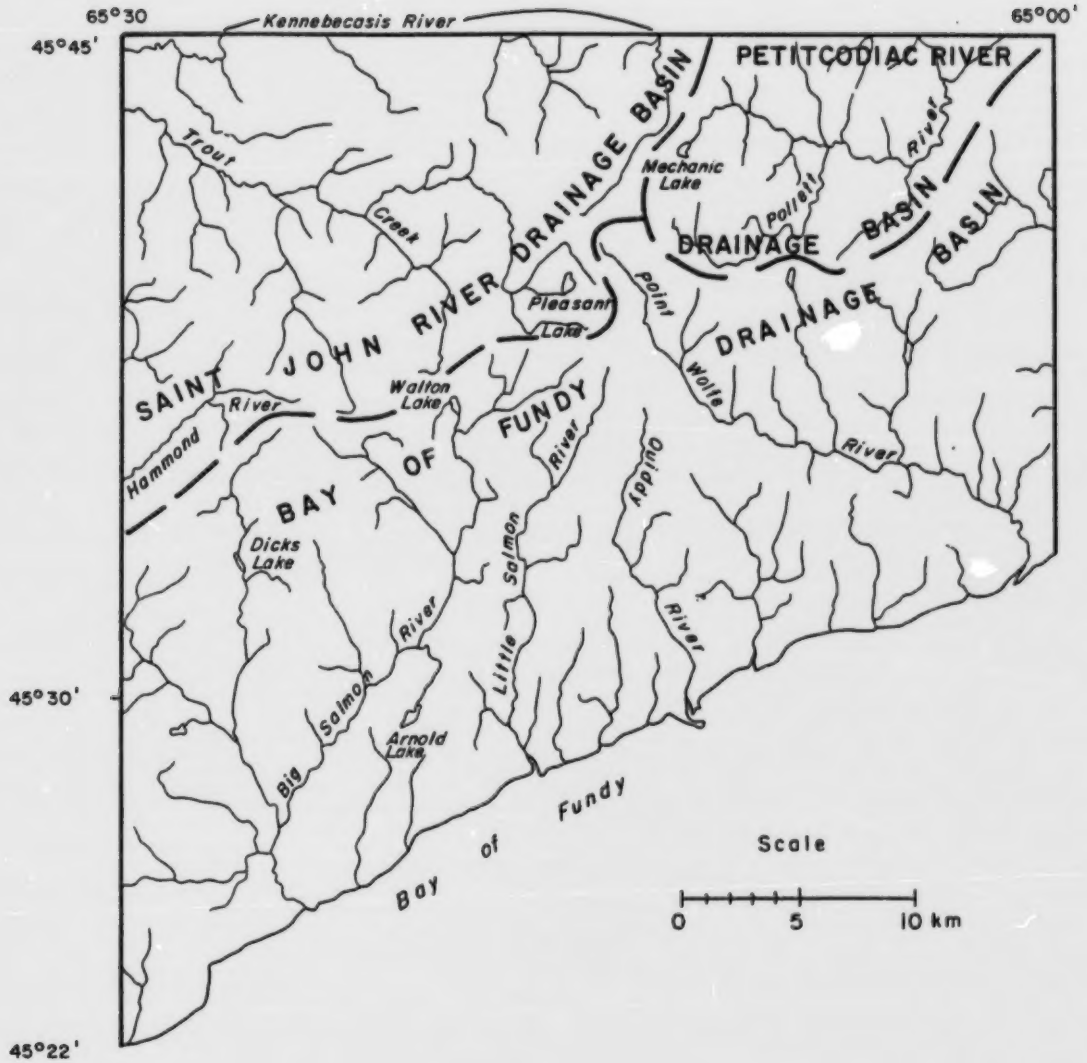

FIGURE 3. Major drainage elements of the Waterford and Salmon River map areas.

(Rampton and Paradis 1981). The presence of waterfalls on all south-flowing streams (Kindle 1962) suggests that they are relatively young features.

BEDROCK GEOLOGY

The bedrock geology of the Waterford and Salmon River map areas is summarized in Figure 4.

The Central Plateau area is underlain by Precambrian or Lower Paleozoic sedimentary, metasedimentary, volcanic, and metavolcanic rocks with lesser areas of granitic, gabbroic, and gneissic rocks. These rocks were deformed during the Late Devonian or Early Carboniferous (Ruitenberg et al. 1977). The Anagance Ridges physiographic subdivision is underlain primarily by Mississippian and Pennsylvanian (Carboniferous) clastic sedimentary rocks, with minor areas of limestone and gypsum. These rocks were folded and faulted subsequent to deposition (Poole and Rodgers 1972). The Mispec Plateau area is underlain by slightly younger Pennsylvanian to Permian clastic sedimentary rocks.

In parts of the area, a weathered, preglacial regolith is developed in the upper few metres of rock (Chalmers 1890). Rampton and Paradis (1981) report thicknesses in excess of 8 m. However, the observations made during the course of this study suggest that the occurrence of sound, glaciated bedrock from which the regolith has been removed is more common in this area than in the surrounding areas.

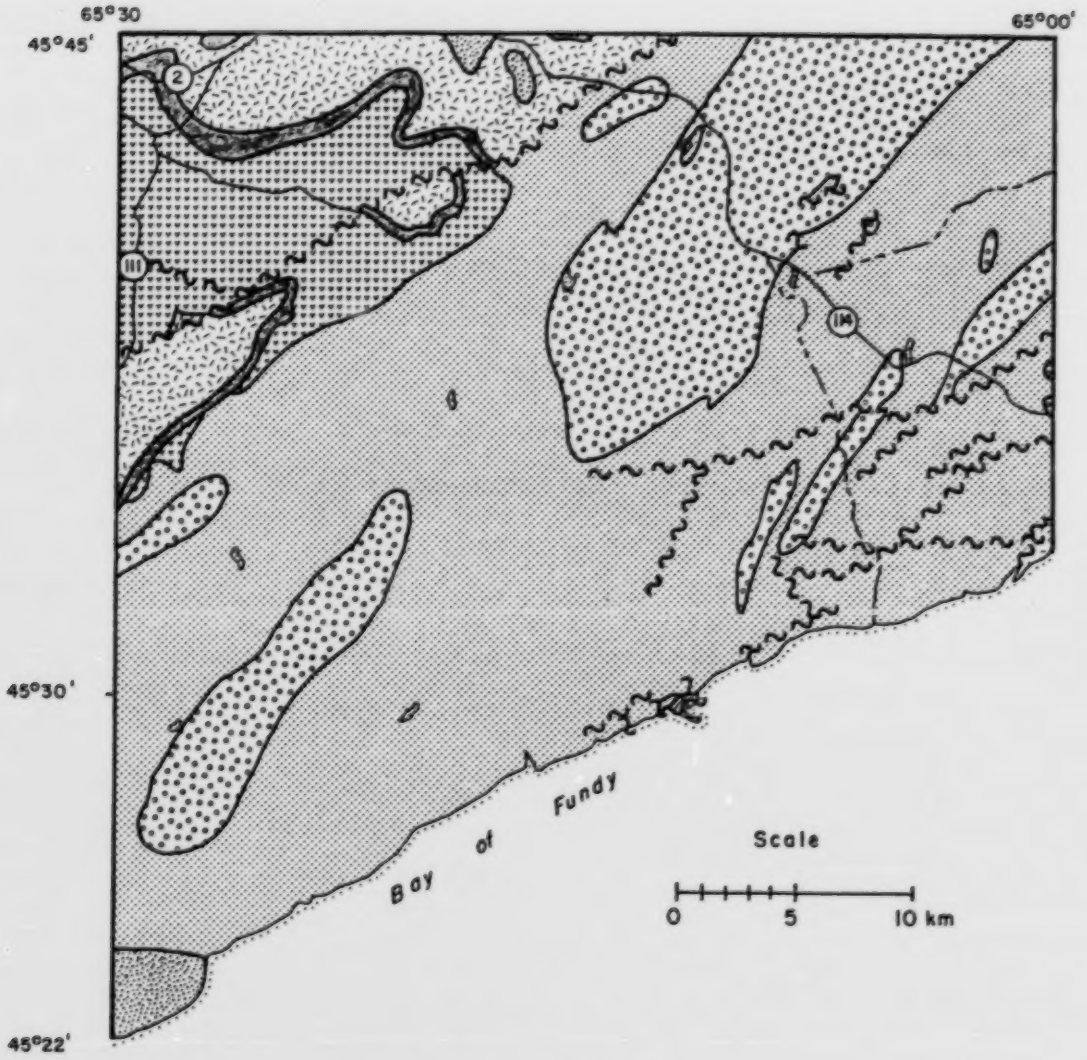

FIGURE 4. Bedrock geology of the Waterford and Salmon River map areas (from Potter 1968).

LEGEND

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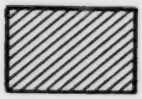
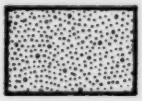


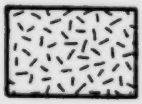
red sandstone, conglomerate, and shale

PENNSYLVANIAN and/or PERMIAN



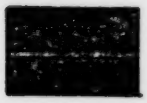
grey sandstone, shale, and conglomerate

MISSISSIPPIAN and/or PENNSYLVANIAN

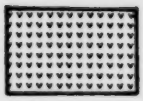


red conglomerate, sandstone, and shale

MISSISSIPPIAN

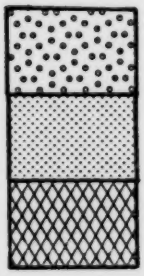


mainly limestone and gypsum



grey to red sandstone, conglomerate, and shale (including oil shale)

PRECAMBRIAN or LOWER PALAEOZOIC



Granitic rocks, gabbro, and gneiss

sedimentary and volcanic rocks and their metamorphic equivalents

limestone, quartzite, argillite, or related rocks

SYMBOLS

∿∿∿∿ fault

Further details concerning the bedrock geology of the Waterford and Salmon River map areas can be obtained from Carroll (1973a, b, c), Evans and Alcock (1945), Kindle (1962), and Ruitenberg et al. (1979), and from more detailed maps listed in Carroll (1985).

SURFICIAL GEOLOGY

The predominant surficial unit in the study area is a blanket of lodgement till that averages 0.5 to 1.5 m in thickness. It "varies from sandy to rubbly to stoney (sic) to bouldery" (Rampton and Paradis 1981, p. 7), and may consist in part of ablation materials. However, significant accumulations of ablation till are of very limited extent in the area. Locally, the tills may be difficult to differentiate from weathered bedrock (Rampton and Paradis 1981), since this weathered rock was the primary source material for the tills (Chalmers 1890).

Glaciofluvial deposits are common in the area; some are of considerable extent. The west-central part of the area is traversed by a major dendritic esker system that feeds into the Big Salmon River valley. Within the valley, the eskers and associated ice-contact deposits are flanked by extensive glaciofluvial outwash deposits. This drainage system culminated in an outwash delta at the mouth of the river. Similar deltas are found at the mouths of Berry Brook, the Quiddy River, and, within Fundy National Park, the Point Wolfe

River. The latter is probably related to the upstream-flowing esker system in the Pollett River valley, in the northeastern corner of the area. In addition, an extensive area of ice-contact stratified drift, interpreted as a kame-and-kettle complex (Rampton and Paradis 1981), is present along the Kennebecasis River valley in the northwestern part of the area.

The steeper slopes within the area are often bare at the summits, and blanketed by coarse colluvial deposits downslope. Alluvial deposits are of minor extent in the area, with the exception of the lower Trout Creek valley, where extensive alluvial deposits underlie the Town of Sussex and the Village of Sussex Corner (McCutcheon and Thibault 1981).

Further details concerning the surficial geology of the region can be obtained from Rampton and Paradis (1981) and Rampton et al. (1984).

GRANULAR AGGREGATE RESOURCES

QUALITY

Analysis: The quality of an aggregate material is dependent upon two primary physical characteristics:

1) the grain-size characteristics of the material, and

2) the lithologies of its component clasts.

Grain-Size Characteristics: The grain-size characteristics of an aggregate are determined by passing a sample of

the material through a nest of sieves (A.S.T.M. C136-76) and they apply specifically to the sample examined. Therefore, an attempt was made to collect samples that were representative of the material in the observed sections. Samples weighing approximately 5 to 50 kg were obtained, the size of the sample being determined by the percentage of gravel in the material and its coarseness. Analysis of the samples was carried out using wet sieve analysis (A.S.T.M. C117-76) to accurately determine the fines (silt and clay) content. The results of these mechanical analyses are tabulated in the Appendices.

The grain-size characteristics of the material were also estimated in the field, on a qualitative basis, using the standard geological grain-size classification outlined in Table I. The relative proportions of the major grain-size classes within the materials are described in terms of the textural classification outlined in Table II. In addition, the terms "fine aggregate" and "coarse aggregate" are used to identify material predominantly finer and predominantly coarser, respectively, than 4.75 mm (A.S.T.M. C125-76).

Lithologic Characteristics: The composition of the clasts within an aggregate deposit has a significant effect on the quality of the material. Preferably, clasts should exhibit three primary characteristics: a) they should be of good physical quality, b) they should be uncoated, and c) they should not react with any cementing materials.

TABLE I

GRAIN-SIZE CLASSIFICATION
(Classification modified after Friedman and Sanders 1978)

Descriptive Size Category	Limiting Size (Minimum)	Approximate Equivalent In DOT Sieve Sizes (Not Passing)
Boulders	256 mm	-
Cobbles		
- large	128 mm	-
- small	64 mm	75 mm
Gravel		
- very coarse	32 mm	31.5 mm
- coarse	16 mm	19.0 mm
- medium	8 mm	9.5 mm
- fine	4 mm	4.75 mm
- very fine	2 mm	2.36 mm
Sand		
- very coarse	1 mm	1.18 mm
- coarse	500 um	600 um
- medium	250 um	300 um
- fine	125 um	150 um
- very fine	63 um	75 um
Silt and Clay (fines)	-	-

TABLE II

TEXTURAL CLASSIFICATION
(Modified from Folk 1968)

	% Passing 2.35 mm (Approximate Range)
Gravel	0 - 20
Sandy Gravel	20 - 70
Gravelly Sand	70 - 95
Sand	95 - 100

	% Passing 75 um (Approximate)
Silty	10+
Slightly Silty	5 - 10

To determine the lithologic characteristics of a deposit, a sample of approximately 100 pebbles in the 25 to 50 mm size range was collected from a fresh exposure. The lithologies represented by the clasts were determined, and they were divided into two groups, sound and unsound. The two groups are differentiated primarily on the basis of the resistance of the clasts to disintegration under mechanical impact (with the exception of chert, which is classed as unsound due to its known chemical instability in concrete). The results of this test should not be confused with those from quantitative soundness tests (e.g., the sodium or magnesium sulphate tests), or those from abrasion tests (e.g., the Los Angeles abrasion loss test).

The results of the above qualitative soundness tests, plus any quantitative test results available from DOT, are tabulated in the Appendices.

Limitations: There are five major factors that serve to degrade the quality of an aggregate: two relate to texture, and three to clast lithology. These are: 1) an excessive fine particle content; 2) poor grading; 3) poor physical quality of clasts; 4) coatings on clasts; and 5) reactive character of clasts (i.e., alkali-reactivity in cement).

Fine Particle Content: A content of fine particulate matter (that material passing through a 75 um sieve) in excess of 5% in an aggregate is generally considered deleterious. For some usages, even lower percentages are specified (Bates 1969).

Fine particles may occur as discrete beds within a deposit, as coatings on larger clasts, as disseminated particles throughout a deposit, or as some combination of the above. If an aggregate contains fines in excess of the specified limits for a particular use, it may be upgraded to an acceptable level by washing, with an attendant significant increase in the cost of exploitation. However, in the first case above, this may be avoided by selective extraction of material.

Grading: Grading refers to the particle size distribution within the aggregate (i.e., the relative proportions of material in the different size categories). The natural grading of a deposit may be improved by crushing, by selective screening and recombination, or by the combination of materials from different sources or areas. However, such processing increases production costs. Excessive variability in the grading of a deposit can also lead to production problems.

Grading limits are specified by users (e.g., DOT), and will vary, depending upon the proposed use of the material. Poor grading may restrict the potential of certain deposits for certain uses.

Physical Quality: Ideally, clasts should be hard, strong and durable. Soft materials such as shale, schist, and friable sandstones are unsuitable for use in most aggregates, since they disintegrate easily, while porous or fractured rock fragments may split due to the expansion of water as it freezes

(Bates 1969). Poor physical quality is often the most significant quality-limiting factor in New Brunswick aggregates.

Clast Coatings: The presence of silt, clay, carbonate, or oxide coatings on clasts renders them unsuitable for use in high-specification aggregate, since they weaken the bond between the clast and the cementing agent, and in concrete may become chemically unstable (Bates 1969). Silt and clay coatings may be removed by washing, with a consequent increase in the cost of exploitation. Coatings of this type are prevalent on clasts in deposits with high fine particle contents, but may also be found in other deposits.

Alkali-reactivity: Clasts that contain opaline or cryptocrystalline silica react with the alkalies in cement. As a result of this reaction, the clasts expand, producing cracks within the concrete that make it susceptible to freeze-thaw and other destructive processes. Chert and some felsic extrusive rocks were considered to be the primary offenders (Bates 1969). However, other rocks, such as schists, quartzites, greywackes, argillites, and phyllites have been shown to cause problems (Swenson 1973). In cases of suspected reactivity, the use of low-alkali portland cement or partial substitution of a pozzolanic material - such as fly-ash or finely ground siliceous material - for some of the cement is recommended (Bates 1969; Swenson 1973).

In the Waterford and Salmon River map areas, the content of potentially reactive clasts is significantly high in most

deposits. Considering the above recommendations, the materials from these deposits should be assumed to be reactive, until proven otherwise.

DESCRIPTION OF MAP UNITS

The granular aggregate resources of the Waterford and Salmon River areas are found in deposits of five basic types. These are: 1) ablation till; 2) ice-contact stratified drift; 3) glaciofluvial outwash and outwash deltas; 4) glaciofluvial complexes; and 5) ancient alluvium. A general description of each of these deposit types is given below.

Ablation Till: Ablation till comprises the material that was carried into the terminal zone of a melting glacier by transport within or upon the ice, and then deposited onto the ground by means of sliding, flowing, or subsidence (Flint 1971). "The resulting till is therefore loose, noncompact, and nonfissile, and its clasts are less strongly abraded than those in lodgement till" (Flint 1971, p. 171). Ablation till deposits may take on a variety of topographic forms, with surfaces ranging from flat through hummocky to ridged. Typically, ablation till exhibits very poor sorting, generally containing the entire grain-size range from clay through to boulders. Excessive quantities of both fines and boulders are present in many of these tills.

In the Waterford and Salmon River map areas, only three small areas of ablation till of significant thickness are

present, all in the southwestern part of the area. No good exposures are present in these deposits; however, the material exposed appears to be of relatively poor quality.

Ice-contact Stratified Drift: Ice-contact stratified drift deposits are those deposits of glaciofluvial origin that are formed of sediment deposited by meltwater on or against glacial ice. Characteristically, such deposits form distinctive constructional landforms of various types. Within the study area, these include eskers, kames and kame complexes, plus a few features of indeterminate, but presumed ice-contact, origin.

Eskers are linear accumulations of sediment formed either by deposition from meltwater streams flowing in tunnels within a melting glacier (Flint 1971), or by deposition of a series of overlapping fans or "beads" at the point of stream discharge from a retreating glacier (Embleton and King 1975). Most of the eskers in the study area appear to be of the former type. Kames are mound-like hills, ranging from conical to irregular in form, formed from sediment that was washed into crevasses or other openings or depressions in the glacier surface and remained as mounds after the ice melted away (Flint 1971). Kame complexes are large areas dominated by numerous mounds of kame-like form and origin and related ice-contact deposits (Price 1973).

In general, ice-contact stratified drift deposits consist primarily of sand or gravel, with variable quantities of fines, cobbles, and boulders. The sorting can vary from very poor to

good, while the texture commonly exhibits abrupt lateral and vertical variations - sometimes due to postdepositional deformation as a result of slumping subsequent to the withdrawal of the supporting glacier ice. Because of their close association with the glacier, such deposits may contain pockets of ablation or lodgement till.

Glaciofluvial Outwash: Glaciofluvial outwash comprises the sediment that is deposited beyond the margins of a glacier by the action of meltwater streams. In general, this material consists of well-washed, horizontally stratified sand or gravel. These deposits usually exhibit a flat, gently sloping topography. However, the meltwater streams that form these deposits may transport and deposit blocks of ice in addition to their sediment load. The melting-out of buried ice blocks within the outwash deposits results in the formation of small circular to irregular depressions in their surfaces referred to as kettle holes (Flint 1971).

Where meltwater streams discharge into bodies of standing water, outwash deltas are formed. These deposits consist of a topset unit of glaciofluvial outwash, typically one to several metres thick, overlying steeply dipping foreset beds, which in turn overlie flat-lying bottomset beds. The foreset beds are typically finer grained than the topset beds, and generally consist primarily of fine aggregate, locally silty. The bottomset beds generally consist of silt and clay, and thus do not constitute an aggregate resource.

Glaciofluvial Complexes: For the purposes of this report, glaciofluvial complexes are defined as intimately associated deposits of ice-contact stratified drift and glaciofluvial outwash that cannot be clearly delineated at the 1:50 000 scale of the accompanying maps. These complexes may also include minor areas of glaciomarine or glaciolacustrine silts and clays, ablation till, or lodgement till.

Ancient Alluvium: Alluvium consists of unconsolidated material that was deposited by the flowing water of streams or rivers during the postglacial period. Ancient alluvium is found in terraces that now lie above the level of the modern floodplain. Characteristically, the material consists of horizontally stratified sand or gravel, although it may contain a significant fines component (usually in the form of discrete beds, commonly at the surface of the deposit). Within the study area, the potential of such deposits to serve as aggregate sources is limited by their shallow water tables.

MAJOR GRANULAR AGGREGATE SOURCES

There are only two major granular aggregate source areas in the Waterford-Salmon River area. The most significant of these is the large glaciofluvial complex that lies at the headwaters of Trout Creek and the Big Salmon River (see H11-11, 15, 16, 18 to 25). This deposit contains an estimated 37.9 million m^3 workable material. The material is primarily fair- to good-quality coarse aggregate. This deposit has seen only limited

extractive activity, and could warrant a detailed testing program.

The other major deposit is the kame complex flanking the Kennebecasis River and McLeod Brook (see H11-4, 5, and 6). This deposit has estimated workable reserves of 5.55 million m^3. The material is primarily of poor quality; the content of fines and unsound clasts is generally high.

Two other deposits are considered to have potential to produce significant volumes of aggregate. These are the Kennebecasis River esker at the headwaters of the river, with an estimated 2.4 million m^3 in reserves (see H11-28), and the Pollett River esker system, with an estimated 1.9 million m^3 in reserves (see H11-34). Neither of these deposits is well exposed, but the results of the sample tests suggest that they have the potential to produce good-quality coarse aggregate. These two deposits could warrant detailed testing programs.

The remaining deposits in the study area are either small in size or contain relatively small volumes of workable material. However, they may constitute valuable local sources of aggregate material. For further details concerning these deposits the reader is referred to the descriptions in the Appendices.

CONCLUSIONS

The workable reserves of granular aggregate material in the Waterford and Salmon River map areas are estimated to be in the order of 52 million m^3. Approximately three-quarters of these reserves are to be found in the glaciofluvial outwash and ice-contact deposits of the Big Salmon River glaciofluvial complex and its tributary systems. It should be noted that these reserve estimates do not entirely take into account the sterilizing effects of various cultural, economic, or physical restrictions, which may limit or even proscribe exploitation of some of these reserves.

The quality of the material in the area varies from poor to very good. In general, the quality of the material is best in the southern part of the area, where the bulk of the deposits are found. Many of these deposits are undeveloped and could warrant detailed testing and evaluation.

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APPENDIX A

SITE DESCRIPTIONS

SALMON RIVER MAP AREA

21 H/6

LOCATION:	H6-1	**NTS:**	21 H/6
TYPE OF DEPOSIT:	Glaciofluvial outwash (delta)	**COUNTY:**	Saint John
EXPOSURE TYPE:	Road cut	**PARISH:**	Saint Martins
STATUS:	Undeveloped	**UTM:**	046 274

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil: Developed on the underlying material; the upper half is slightly silty; the lower half is oxidized.

1.0 m Cobbly Sandy Gravel: Cobbly fine to very coarse gravel and fine to coarse sand; clasts are rounded to well rounded, and very clean; clasts exceeding 0.1 m in size are estimated to comprise 3 to 5% by volume; maximum clast size is 0.2 m; this material exhibits crude subhorizontal stratification.

1.1 m Slump Covered: Assumed to be material as above.

A nearby site in this deposit was sampled by Finamore and Lohse (1977). The material they described was similar, but somewhat finer; 50.7% passing 4.75 mm, and 0.5% passing 75 um.

An area between the road and the shore was tested by DOT (1980). Their results were as follows:

Pit Run Material

Mechanical Analysis: coarse aggregate (8 samples)

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	77.5	64.3	57.8	40.9	32.6	27.4	25.3	20.5	5.9	0.7	0.3

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 8%	Sound Lithotypes 92%
felsic intrusive 3; weathered 2; mafic intrusive 1; sandstone 1; siltstone 1	quartzite 47; felsic intrusive 21; metasedimentary 7; felsic extrusive 4; quartz 4; sandstone 3; gneiss 2; mafic intrusive 1; conglomerate 1; greywacke 1; argillite 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
27	10	2.5	250 000

LOCATION #: H6-1 **(cont'd)**

39 to 54% passing 4.75 mm (average 47%)
0.9 to 2.0% passing 75 um (average 1.4%)

fine aggregate (1 sample)
86% passing 4.75 mm; 8.9% passing 75 um

Los Angeles Abrasion Loss: 18.5 to 19.7% (average 19.3%)

Recommended for use as borrow, subbase, and base aggregate.

Crushed Material
Mechanical Analysis
51% passing 4.75 mm; 1.5% passing 75 um

Absorption: stone 1.19%; sand 1.6%
Soundness loss: stone 1.94%; sand 3.56%
Sand equivalent: 76

Recommended for use as asphaltic base and seal aggregate and surface treatment chips.

This deposit appears to be an outwash delta formed at the mouth of Berry Brook. The deposit thickness may, therefore, be considerably more than the 2.5 m used in estimating reserve volumes. Test pitting or drilling would be required to accurately determine the deposit thickness.

Reserves are estimated only for the workable area outside of the 300 m designated shore area, as defined in the Quarriable Substances Act.

LOCATION:	H6-2	**NTS:**	21 H/6
TYPE OF DEPOSIT:	Glaciofluvial outwash (delta)	**COUNTY:**	Saint John
EXPOSURE TYPE:	Shore bluff	**PARISH:**	Saint Martins
STATUS:	Undeveloped	**UTM:**	045 268

SECTION DESCRIPTION & COMMENTS:

This site was described by Finamore and Lohse (1977; their site H6-3). Recent aerial photographs indicate that a small pit has subsequently been developed at this site. The following description and analyses are from Finamore and Lohse (1977).

1.8 m Sand and Gravel: Horizontally(?) stratified, predominantly medium sand and fine to coarse gravel with a few cobbles.

10.7 m Slump Covered: Assumed to be sand and gravel.

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.4mm	600um	300um	150um	75um
% pass.		91.1	85.4	58.4	36.2	27.7	21.5	14.5	5.8	1.6	0.9

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 13%	Sound Lithotypes 87%
chert 5; schist and slate 5; sandstone 3	quartz and quartzite 33; mafic extrusive 17; felsic extrusive 14; felsic intrusive 11; metavolcanic 8; sedimentary 4

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			see H6-1

LOCATION:	H6-3	**NTS:**	21 H/6
TYPE OF DEPOSIT:	Glaciofluvial outwash (delta)	**COUNTY:**	Saint John
EXPOSURE TYPE:	Road cut	**PARISH:**	Saint Martins
STATUS:	Undeveloped	**UTM:**	117 324

SECTION DESCRIPTION & COMMENTS:

0.7 m Soil: Slightly silty soil, developed on the underlying material; contains a large number of boulders.

0.8 m Sandy Gravel: Medium to very coarse gravel and medium to very coarse sand with a few cobbles; horizontally stratified; Sample A was obtained from this unit (exclusive of the coarser material).

1.6 m Sand and Gravel: Predominantly interbedded gravelly fine to coarse sand, and fine to medium sand, with minor interbeds of sandy gravel similar to that above; bedding dips approximately eastward; Sample B was obtained from this unit.

9.1 m Slump Covered: Assumed to be material as above.

Clasts from this section are predominantly subrounded, with light silt coatings. Less than 1% of the volume is estimated to consist of clasts exceeding 0.1 m in size. Maximum observed clast size was 0.6 m.

This section is in the side of a terrace cut in an outwash delta, standing approximately 19 m above the level of the adjacent alluvial plain. This terrace surface is only about 10 m wide, and is adjacent to a second terrace approximately 12 m higher. It is probable that the full 31 m height consists of granular material, although this has not been confirmed.

Reserves are estimated only for the small portion of the area of these terraces lying more than 300 m from the Bay of Fundy shore.

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	A	100.0	87.2	57.4	39.7	26.5	17.5	7.5	2.6	1.2	0.8
	B	100.0	99.1	90.9	77.8	65.4	53.5	29.2	11.2	3.1	1.0

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 8%	Sound Lithotypes 92%
felsic intrusive 3; schist 3; mafic extrusive 2	felsic intrusive 56; felsic extrusive 20; mafic extrusive 13; mafic intrusive 2; quartzite 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
6	2	11	240 000

LOCATION:	H6-4	**NTS:**	21 H/6
TYPE OF DEPOSIT:	Glaciofluvial outwash (delta)	**COUNTY:**	Saint John
EXPOSURE TYPE:	Coastal bluff	**PARISH:**	Saint Martins
STATUS:	Undeveloped	**UTM:**	118 321

SECTION DESCRIPTION & COMMENTS:

0.9 m Soil: Oxidized profile developed on the underlying material.

0.5 m Sandy Gravel: Slightly cobbly fine to very coarse gravel with fine to very coarse sand and a few small boulders; an estimated 5% of clasts exceed 0.1 m in size; clasts are subrounded to rounded, with light to moderate silt coatings.

47.6 m Slump Covered: Limited exposures in the walls of an erosional gully in the bluff at this site suggest that the material fines downward, as is expected for a deltaic deposit; an exposure at the base of the coastal section to the northeast exhibits approximately 6 m of fine to medium sand with silt and clay seams extending above beach level, with sand and gravel above.

This section is in the upper surface of the Big Salmon River outwash delta. All of this surface lies within the 300 m designated shore area, as defined in the Quarriable Substances Act. Major aggregate extraction operations in this area are not recommended.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	85.3	53.4	47.0	29.2	20.1	13.8	10.3	6.5	3.4	1.8	1.2

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 15%	Sound Lithotypes 85%
felsic intrusive 3; sandstone 3; siltstone 3; mafic extrusive 2; weathered 2; felsic extrusive 1; conglomerate 1	quartzite 18; metasedimentary 13; metavolcanic 11; felsic intrusive 10; felsic extrusive 9; mafic extrusive 9; sandstone 6; siltstone 5; mafic intrusive 1; greywacke 1; argillite 1; gneiss 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
6			exploitation not recommended

LOCATION:	M6-S	**NTS:**	21 H/6
TYPE OF DEPOSIT:	Glaciofluvial outwash (delta)	**COUNTY:**	Saint John
EXPOSURE TYPE:	Coastal bluff	**PARISH:**	Saint Martins
STATUS:	Undeveloped	**UTM:**	287 403

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Developed on the underlying material.

0.3 m Sand: Oxidized, clean, well-sorted medium to coarse sand with a few pebbles.

0.5 m Sandy Gravel: Predominantly medium to very coarse gravel and medium sand; contains minor lenses of fine to medium gravel; gravel content estimated at 60%; the material for lithologic analysis was obtained from this unit.

0.7 m Sand: Clean, well-sorted medium sand, with interbeds of gravelly medium to very coarse sand; Sample A was obtained from this unit.

0.3 m Sandy Gravel: Poorly sorted, coarse to very coarse gravel and very fine to medium sand with a few cobbles; clasts are predominantly subrounded, with moderate silt coatings; maximum observed clast size was 0.2 m; Sample B was obtained from this unit.

22.1 m Slump Covered: The upper half of this material appears to be sand and gravel; the lower half is covered by a slump block; however, reddish brown, silty clay was observed at the base of the section nearby.

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% A pass.			100.0	97.6	94.8	90.6	85.7	62.9	18.9	2.9	0.4
B	84.1	37.9	37.9	34.6	32.8	31.5	30.3	24.7	15.2	6.4	0.9

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 22%	Sound Lithotypes 78%
felsic extrusive 10; metasedimentary 5; felsic intrusive 4; metavolcanic 3	felsic extrusive 39; felsic intrusive 19; mafic extrusive 9; mafic intrusive 4; gneiss 3; metavolcanic 2; quartz 2

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
13			exploitation not recommended

LOCATION #: H6-5 **(cont'd)**

The above section is in a small, narrow terrace lying approximately 4 m below the level of the main delta surface. This terrace was probably wave cut. The upper 2 m of material is probably a beach deposit reworked from the delta material. The bedding exposed in the section is approximately horizontal.

This deposit is a remnant of a large outwash delta built at the mouth of the Quiddy River. Virtually all of the deposit to the east of the river lies within 300 m of the coast. Consequently, aggregate extraction is not recommended in this area. However, part of the area to the west of the river could be exploited (see H6-103).

H6-101 UTM 129 323

Finamore (field notes, 1976) describes the section at this site as consisting of 6.1 m of silty sandy gravel with a number of cobbles and boulders, and with some clayey silt bands, overlying 1.2 m of contorted, stratified silt. The section described may be a portion of a slump block, which could account for the contortion at the base. This deposit is probably a remnant of a large glaciofluvial delta which is though to have extended from Salmon River to Seely Beach. Due to its location, none of the material in this deposit is extractable.

H6-102 UTM 140 329

Finamore (field notes, 1976) describes the section at this site as consisting of approximately 3 m of horizontally stratified sandy gravel with a few cobbles, overlying approximately 3 m of medium sand, in turn overlying 3 to 15 m of interstratified clayey silt and fine sand. As with the other deposits along this portion of the Fundy Coast (H6-4, 101), this deposit is probably a remnant of a much larger deltaic feature. All of that part of the deposit to the east of Long Beach Brook, and most of that part to the west, lie within the 300 m designated shore area, per the Quarriable Substances Act. However, estimated reserves of 250 000 m^3 of material are present in the latter part of the deposit, outside of the designated shore area. Access to these reserves would be difficult.

H6-103 UTM 276 399

This section is pictured in the Fundy Coastal Zone Study (Hunter and Associates 1982, p. 153). The deposit is an outwash delta, comprising outwash sand and gravel overlying stratified marine silts and sands. From the illustration, the lower unit appears to be approximately twice the thickness of the upper unit. If access could be established, estimated reserves of 200 000 m^3 could be obtained from the northwestern corner of the deposit, outside of the 300 m designated shore area.

APPENDIX B

SITE DESCRIPTIONS

WATERFORD MAP AREA

21 H/11

LOCATION:	H11-1	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Sussex
STATUS:	Active-on-demand	**UTM:**	053 553

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Silty soil, developed on the underlying material.

3.8 m Cobbly Sandy Gravel: Cobbly very fine to very coarse gravel and coarse to very coarse sand with a few boulders; estimated volume of clasts exceeding 0.1 m in size is 3 to 5%; clasts are subrounded to rounded, with light to moderate silt coatings; the unit appears massive.

1.3 m Slump Covered: Assumed to be material as above.

Maximum section height is approximately 6 m.

This deposit appears to be a segment of an esker system in the Wards Creek valley. The road cut through the small segment to the north of this segment (UTM 056 556) exposes 4.5 m of much finer sandy gravel. The segment to the southwest (off the map sheet) contains similar material to that at H11-1 and was tested by DOT (1980). Their results were as follows:

Mechanical Analysis (3 samples):
41 to 65% passing 4.75 mm (average 52%)
4.5 to 5.1% passing 75 um (average 4.8%)

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	76.4	62.4	54.3	41.5	33.1	24.5	14.9	7.9	6.0	5.1	4.4

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 56%	Sound Lithotypes 44%
sandstone 37; felsic intrusive 8; conglomerate 4; felsic extrusive 2; siltstone 2; weathered 2; mafic extrusive 1	sandstone 15; felsic intrusive 9; mafic extrusive 3; greywacke 3; quartzite 3; felsic extrusive 2; siltstone 2; metasedimentary 2; mafic intrusive 1; argillite 1; limestone 1; gneiss 1; quartz 1

ESTIMATION OF RESERVES:

	Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
A	5	2	5	100 000
B	8	8	1	80 000

LOCATION #: H11-1 **(cont'd)**

Los Angeles Abrasion Loss: 40.3%

Recommended for use as borrow and subbase.

A possibly related ice-contact deposit lies about 3 km south of H11-1. Brinsmead and Finamore (1977; H12-64) describe the material as a sandy fine gravel with few cobbles. Their data suggest that the material in this deposit is of better quality than that in the esker system.

The remaining workable reserves at H11-1 are primarily in the southern part of the deposit (estimate A). Reserve estimates for the ice-contact deposit to the south are also included in the table (estimate B).

LOCATION:	H11-2	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Sussex
STATUS:	Abandoned	**UTM:**	078 552

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

1.4 m Sand and Gravel: Gravelly medium to very coarse sand with a few sandy gravel beds, grading downward into gravelly fine to medium sand with a few silty very fine to fine sand beds; clasts are subangular to subrounded, with light to moderate silt coatings; the unit is subhorizontally stratified.

1.9 m Slump Covered: Assumed to be material similar to that above.

Maximum clast size in the pit area is 0.4 m. However, very few clasts exceeding 0.1 m in size are present. In one part of the pit, a thick bed of silty very fine sand overlain by sandy gravel is present.

This deposit appears to be a small kame. Reserves are very limited.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	100.0	93.5	90.5	80.4	71.5	62.0	51.3	37.6	21.3	9.3	4.0

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 32%	Sound Lithotypes 68%
sandstone 16; felsic intrusive 10; felsic extrusive 2; siltstone 2; weathered 2	metavolcanic 16; felsic intrusive 14; felsic extrusive 12; quartzite 12; mafic extrusive 6; greywacke 4; metasedimentary 2; gneiss 2

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			limited

LOCATION:	H11-3	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Glaciofluvial outwash	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Sussex
STATUS:	Inactive	**UTM:**	074 655

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed in a gravelly sand.

1.9 m Sand: Interbedded very fine to fine sand and fine to medium sand; a number of thin silty bands are present, particularly in the upper half of the unit; minor beds of gravelly medium to very coarse sand are present in the lower half; the bedding consists of shallow, large-scale trough cross-beds.

0.7 m Slump Covered: Assumed to be material as above.

This deposit is interpreted as an outwash terrace remnant. However, it could also be of postglacial, alluvial, origin. The material is probably fine throughout the deposit.

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.				100.0	99.5	98.3	96.0	90.5	76.1	45.3	16.0

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
13	12	2	240 000

LOCATION:	H11-4	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Sussex
STATUS:	Abandoned	**UTM:**	085 668

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Silty soil, developed on the underlying material; partially removed (thickness estimated).

1.8 m Gravelly Sand: Gritty very fine to medium sand, grading downward into gravelly medium to very coarse sand; contains a number of silt, or silty, beds; clasts are subangular to rounded; unit exhibits northward-dipping cross-beds.

0.8 m Slump Covered: Assumed to be material as above.

The above section is in the south face of the pit. Approximately 0.5 m of silty clay overlies a relatively fine-grained sandy gravel at the northern end of the pit. The surface to the south of the pit also appears to be covered by silty clay. The pit to the south (UTM 085 665) similarly exposes thin clay and till over sandy fine to coarse gravel.

This deposit is the western portion of a large kame-and-kettle complex (Rampton and Paradis 1981). Most of this part of the deposit appears to lie below a veneer of marine or lacustrine silt and clay. While reserves are extensive, the material quality is too poor to warrant significant exploitation. The reserve estimate pertains to that part of the deposit separated from the main body of the deposit, to the east, by a small, unnamed stream valley.

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.			100.0	97.3	92.8	85.7	75.3	56.0	29.1	13.2	8.7

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
103	75	2	1.5 million

LOCATION:	H11-5	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Cardwell
STATUS:	Active-on-demand	**UTM:**	113 681

SECTION DESCRIPTION & COMMENTS:

South Face, East End of Pit

0.6 m Soil: Slightly silty soil, developed on the underlying material.

2.0 m Sandy Gravel: Medium to very coarse gravel and medium to coarse sand; contains thin lenses of pea gravel or gravelly coarse to very coarse sand; exhibits shallow, small-scale trough cross-bedding; paleoflow direction was westward; the sample was obtained from this unit.

1.1 m Slump Covered: Assumed to be material as above; dense reddish brown till is present at the base of the north face at this end of the pit.

In the north face at the west end of the pit, a 0.6 m thick bed of dense, reddish brown (5YR 4/3) clayey till is present in the middle of the sandy gravel unit, indicating that deposition of the gravel occurred in close proximity to the ice margin.

The clasts in this deposit are subangular to rounded, with light to moderate silt coatings. Maximum clast size in the pit area is 0.5 m. However, clasts larger than 0.1 m in size are rare, comprising less than 1% by volume of the material.

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	88.2	72.7	65.6	48.4	34.9	27.2	18.1	8.5	2.8	1.4	1.0

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 44%	Sound Lithotypes 56%
felsic intrusive 16; sandstone 8; felsic extrusive 5; conglomerate 5; mafic extrusive 2; chert 2; schist 2; siltstone 1; metasedimentary 1; slate 1; weathered 1	felsic intrusive 16; felsic extrusive 14; mafic extrusive 7; quartzite 4; mafic intrusive 3; sandstone 3; gneiss 3; conglomerate 2; siltstone 1; limestone 1; metavolcanic 1; metasedimentary 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
470	300	1	3.0 million

LOCATION #: H11-5 (cont'd)

A site close to the pit was tested by DOT (1978). Their results were as follows:

Pit Run Material

Mechanical Analysis (3 samples)
37 to 49% passing 4.75 mm (average 42%)
1.4 to 6.7% passing 75 um (average 3.6%)

Los Angeles Abrasion Loss: 24.8%

Crushed Material

Mechanical Analysis
58% passing 4.75 mm; 7.7% passing 75 um

Absorption: stone 2.75%; sand 1.66%
Soundness Loss: stone 4.67%; sand 4.60%
Sand Equivalent: 48

No recommendations were made regarding use.

This deposit is a large kame-and-kettle complex (Rampton and Paradis 1981). The DOT (1978) data suggest that the deposit is irregular in thickness, with bedrock locally close to the surface. Most of the 15 test holes passed through 1 to 2 m of sandy gravel and up to 1 m of clay. One of the test holes passed through the clay into a further 3+ m of sandy gravel. The "clay" may be equivalent to the till layer described above.

Because of the irregularity of the material in the part of the deposit examined and the lack of information for most of the area, an average deposit thickness of only 1 m has been used for reserve estimation. Reserves could be significantly greater. The reserve estimate pertains to the main body of the deposit on the Waterford map sheet bounded to the east by McLeod Brook and to the west by the narrow portion of the deposit just east of the Cardwell-Sussex Parish line.

LOCATION:	H11-6	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Cardwell
STATUS:	Inactive	**UTM:**	151 682

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

1.2 m Sandy Gravel: Poorly sorted very fine to very coarse gravel and slightly silty medium to very coarse sand with a few cobbles; locally, the sand matrix consists of silty very fine to fine sand; clasts are subangular to subrounded, with light to moderate silt coatings; clasts exceeding 0.1 m in size are estimated to comprise 1% of the section; maximum observed clast size was 0.3 m; the unit is subhorizontally stratified.

4.7 m Slump Covered: Assumed to be material as above.

This pit exposes a maximum of approximately 7.5 m of material. It was tested by DOT (1978), with the following results obtained:

Pit Run Material

Mechanical Analysis (13 samples)
33 to 60% passing 4.75 mm (average 49%)
2.9 to 21.8% passing 75 um (average 8.8%)

Los Angeles Abrasion Loss: 27.2 to 37.3% (average 30.5%)

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	94.7	82.6	76.1	59.7	46.7	33.3	24.9	15.8	10.3	7.7	5.7

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 54%	Sound Lithotypes 46%
schist 14; felsic intrusive 11; conglomerate 9; metavolcanic 6; siltstone 4; sandstone 2; metasedimentary 2; weathered 2; felsic extrusive 1; mafic extrusive 1; chert 1; shale 1	metavolcanic 13; felsic intrusive 8; quartzite 6; mafic extrusive 5; felsic extrusive 3; metasedimentary 3; siltstone 2; greywacke 2; gneiss 2; mafic intrusive 1; conglomerate 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
57	25	3	750 000

LOCATION #: H11-6 (cont'd)

Recommended for use as borrow. Of marginal quality for subbase and base usage.

Crushed Material

Mechanical Analysis
52% passing 4.75 mm; 5.9% passing 75 um

Absorption : stone 2.15%; sand 2.74%
Soundness Loss: stone 3.89%; sand 2.85%
Sand Equivalent: 69

DOT has also tested the pit area approximately 0.5 km to the west (cf. H11-103), and an area about 0.5 km to the south. The test results for the latter (DOT 1969) are as follows:

Mechanical Analysis (7 samples)
31.3 to 58.7% passing 4.75 mm (average 50.1%)
6.0 to 15.4% passing 75 um (average 10.3%)

Los Angeles Abrasion Loss: 31.8 to 47.6% (average 37.9%)

Recommended for use as borrow only.

This deposit is part of a large kame-and-kettle complex, most of which lies to the west. Reserves are estimated for the area to the east of McLeod Brook.

A related deposit lies to the southeast, along McLeod Brook. The small abandoned pit in this deposit (UTM 161 668) exposes approximately 2 m of sandy gravel. Workable reserves are limited.

LOCATION:	Hil-7	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Cardwell
STATUS:	Inactive	**UTM:**	156 656

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Silty soil, developed on the underlying material.

1.5 m Sandy Gravel: Predominantly very fine to coarse gravel and medium to very coarse sand, with some coarser, cobbly beds and minor openwork beds; some beds are silty; bedding is subhorizontal. Sample A was obtained from the lower half of this unit.

1.1 m Sand: Predominantly fine to medium sand, with minor coarser beds; some of the beds are silty; unit is subhorizontally stratified. Sample B was obtained from this unit.

0.8 m Sandy Gravel: Reddish brown, slightly silty, very fine to coarse gravel and very fine to very coarse sand, with a few small cobbles; capped by a 2 to 3 cm thick silt bed. Sample C was obtained from this unit.

6.4 m Slump Covered: Assumed to be sand or gravel similar to that above.

Clasts in this deposit are subangular to subrounded, with heavy silt coatings. Maximum clast size is 0.4 m. However, clasts larger than 0.1 m are estimated to comprise only 1% of the deposit.

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass A	90.5	77.6	72.9	60.3	47.7	35.6	23.8	13.6	7.9	6.0	5.0
B				100.0	97.8	96.5	93.1	76.4	38.2	15.0	8.1
C	100.0	88.1	82.2	62.7	44.6	30.5	20.9	16.2	13.6	10.5	8.1

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 46%	Sound Lithotypes 54%
conglomerate 18; felsic extrusive 6; chert 5; sandstone 4; weathered 4; schist 3; felsic intrusive 2; gypsum 2; metavolcanic 1; slate 1	felsic extrusive 8; mafic extrusive 7; felsic intrusive 6; metasedimentary 6; mafic intrusive 5; sandstone 4; quartzite 4; quartz 4; siltstone 2; greywacke 2; gneiss 2; hornfels 2; conglomerate 1; metavolcanic 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
13	4	5	200 000

LOCATION #: H11-7 **(cont'd)**

A lower lift extends 3.4 m below the base of the upper lift. The material is presumed to be sand or gravel, though there are no good exposures. This level of the pit has been used as a dump site.

This pit has been tested by DOT (1973). The results are as follows:

Mechanical Analysis
33% passing 4.75 mm; 0.2% passing 75 um

Los Angeles Abrasion Loss: 26.4%

Recommended for use as borrow and subbase aggregate. Of marginal quality for use as base course aggregate.

The variance between the DOT data and that obtained during this study suggests that the deposit is variable in texture. The boundaries of this deposit are indistinct, and detailed testing would be required to fully assess the volume and quality of the material.

LOCATION:	H11-8	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact (esker)	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Cardwell
STATUS:	Inactive	**UTM:**	131 629

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

1.9 m Sand: 0.2 m medium to very coarse sand, over 1.0 m medium sand with minor gritty beds, over 0.7 m medium to coarse sand with minor gravel; the unit is cross-bedded, with bedding dipping southward; the boundary between this unit and the underlying unit is a steeply dipping fault plane.

1.0 m Gravelly Sand: Medium to very coarse sand with very fine to medium gravel; contains several beds of slightly coarser sandy gravel.

3.9 m Slump Covered: Assumed to be mainly sand.

The sample is a composite of both of the exposed units. Most of the material in the pit area is sand. Those clasts present are subrounded to rounded. No clasts exceeding 0.1 m in size were observed.

The material in the adjoining pit to the northwest is similar to that described. Maximum section height in this pit is 9.2 m.

This esker has been intensively worked. The southeastern segment (Area A) is nearing depletion. The northwestern segment (Area B) is approximately half depleted. The ill-defined area of hummocky topography to the north of the latter segment (Area C) warrants investigation. It may contain significantly more material than estimated.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	100.0	95.4	92.3	85.0	76.6	66.6	51.0	29.4	5.3	2.3	1.7

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
A 10			nearing depletion
B 15	6	5	300 000
C 10	10	2	200 000

LOCATION:	H11-9	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Waterford
STATUS:	Abandoned	**UTM:**	132 569

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil: Slightly silty soil, developed on the underlying material.

0.7 m Sandy Gravel: Fine to very coarse gravel and fine to very coarse sand, with a few cobbles and several silty beds; clasts are subangular to subrounded, with light silt coatings; maximum clast size is 0.3 m, but clasts exceeding 0.1 m in size constitute less than 1% of the material; the unit exhibits crude subhorizontal stratification.

3.7 m Slump Covered: Assumed to be material as above.

This small deposit may be a kame terrace. Similar small deposits may be present elsewhere along the Parlee Brook valley.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	92.9	69.1	65.3	51.6	39.3	30.1	22.4	14.8	8.4	4.5	2.8

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 33%	Sound Lithotypes 67%
sandstone 9; chert 7; felsic intrusive 3; mafic extrusive 3; conglomerate 3; felsic extrusive 2; siltstone 2; slate 2; weathered 2	mafic extrusive 18; quartzite 12; felsic extrusive 9; sandstone 9; felsic intrusive 7; mafic intrusive 3; metavolcanic 3; siltstone 2; greywacke 1; metasedimentary 1; gneiss 1; quartz 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			limited

LOCATION:	H11-10	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Kings
EXPOSURE TYPE:	Road cut	**PARISH:**	Waterford
STATUS:	Undeveloped	**UTM:**	149 532

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil: Slightly silty soil, developed on the underlying material.

1.0 m Cobbly Sandy Gravel: Poorly sorted, cobbly very fine to very coarse gravel and fine to very coarse sand, with a few boulders; clasts are subrounded to rounded, with moderate silt coatings; maximum clast size is 0.5 m; clasts exceeding 0.1 m in size are estimated to comprise 5 to 10% of the material; the unit exhibits crude subhorizontal stratification.

1.3 m Slump Covered: Assumed to be material as above.

This deposit is an area of hummocky ice-contact material related to the esker along Crow Brook, to the south. The hummock at this site has a maximum height of 7 m.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	70.5	61.2	56.9	48.2	37.5	23.2	12.5	7.2	4.9	3.6	2.7

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 36%	Sound Lithotypes 64%
sandstone 22; mafic extrusive 3; siltstone 3; metavolcanic 3; schist 2; weathered 2; felsic extrusive 1	mafic extrusive 23; felsic extrusive 13; mafic intrusive 5; metavolcanic 5; sandstone 4; gneiss 4; quartzite 4; felsic intrusive 3; metasedimentary 2; quartz 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
18	10	2	200 000

LOCATION:	H11-11	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact (esker)	**COUNTY:**	Kings
EXPOSURE TYPE:	Road cut	**PARISH:**	Hammond
STATUS:	Undeveloped	**UTM:**	158 503

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil: Slightly silty soil, developed on the underlying material.

1.1 m Cobbly Sandy Gravel: Poorly sorted, cobbly very fine to very coarse gravel and very fine to very coarse sand; the upper 0.4 m contains a few boulders; the lower part is less cobbly than the upper; clasts are subangular to subrounded, with moderate to heavy silt coatings; maximum clast size is 0.5 m; clasts exceeding 0.1 m in size are estimated to comprise approximately 5% of the material; the material appears to be crudely stratified; the sample was obtained from the lower part of the unit.

4.3 m Slump Covered: Assumed to be material as above.

The maximum height of the esker where it is crossed by the road is approximately 14 m.

This esker is part of a system of outwash and ice-contact deposits that extends along Crow Brook to its confluence with the Big Salmon River, where it joins with the major glaciofluvial system in that valley. Reserves are estimated for the glaciofluvial complex deposit area to the west of Crow Brook and north of the Shepody Road. Limited volumes of material are also present in the two alluvial fans near the north end of the deposit. See H11-23 and H11-24 for descriptions and reserve estimates for the remainder of the deposits along Crow Brook.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	78.0	66.8	63.2	46.5	31.0	20.7	15.0	10.5	7.7	5.1	3.1

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 16%	Sound Lithotypes 84%
felsic intrusive 3; sandstone 3; shale 2; weathered 2; felsic extrusive 1; mafic extrusive 1; conglomerate 1; chert 1; metasedimentary 1; schist 1	felsic extrusive 22; quartzite 15; mafic extrusive 14; felsic intrusive 12; metavolcanic 6; metasedimentary 5; mafic intrusive 4; hornfels 4; conglomerate 1; sandstone 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
60	45	5	2.3 million

LOCATION:	H11-12	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Glaciofluvial outwash (delta)	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Waterford
STATUS:	Active-on-demand	**UTM:**	199 629

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil: Slightly silty soil, developed on the underlying material.

2.9 m Sandy and Cobbly Gravel: Subhorizontally stratified sandy gravel and cobbly gravel; beds vary from very fine to medium gravel and medium to coarse sand, through to cobbly medium to very coarse gravel with a matrix of coarse to very coarse sand; clasts are subangular to subrounded, with moderate to heavy silt coatings.

9.6 m Slump Covered: Local exposures through the slump cover suggest that the material consists of delta foreset beds; they do not appear to be much finer than the overlying material; till may be present at the base of the pit.

The material thickness was much less in the now largely depleted southwestern part of the deposit (approximately 3 m minimum). The material was also finer.

The maximum clast size in the pit area is 0.9 m. It is estimated that 2 to 5% of the material in the pit area exceeds 0.1 m in size.

Reserves are calculated for the delta only. Workable reserves in the alluvial fan to the southwest are very limited. Reserves in the (presumed) ice-contact deposit to the northwest are unknown. Up to 1 m of sandy gravel is exposed along the road in the area indicated. This deposit is not identifiable on the aerial photographs.

MECHANICAL ANALYSIS:

sieve	100mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	85.4	67.6	62.3	48.9	33.6	20.4	10.0	4.6	2.4	1.4	1.1

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 42%	Sound Lithotypes 58%
felsic intrusive 10; mafic extrusive 8; felsic extrusive 7; mafic intrusive 4; conglomerate 4; schist 3; chert 2; sandstone 1; metavolcanic 1; metasedimentary 1; weathered 1	felsic intrusive 14; felsic extrusive 13; mafic extrusive 8; mafic intrusive 7; metavolcanic 4; sandstone 3; quartzite 3; metasedimentary 2; gneiss 2; siltstone 1; limestone 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
12	4	5	200 000

LOCATION:	H11-13	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Glaciofluvial outwash (delta)	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Waterford
STATUS:	Active-on-demand	**UTM:**	213 619

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil: Slightly silty soil, developed on the underlying material.

2.5 m Sandy Gravel and Gravel: Large-scale, cross-bedded sandy gravel and openwork gravel; the sandy gravel is generally fine to coarse gravel and fine to very coarse sand; the openwork gravel is medium to very coarse gravel with a few cobbles; clasts are subangular to subrounded, with light to moderate silt coatings; individual beds are in the order of 1 m thick; the beds dip southeastward.

3.2 m Slump Covered: Assumed to be material as above.

The above section is in the southeast flank of the deposit. The central section is 18.9 m high, with the highest part of the deposit standing approximately 3 m above the top of the face. Bedrock, overlain by 0.3 m of dense, reddish brown till is exposed at the base of the central section.

Maximum clast size in the pit area is 0.3 m. The content of clasts larger than 0.1 m in diameter is estimated to be less than 1%.

Reserves have been calculated only for that portion of the deposit containing the pit. The portion of the deposit to the northwest, across the stream, is inferred from the aerial photographs, and requires confirmation. The estimated workable thickness is conservative, due to the unknown nature of the bedrock topography beneath the deposit.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	98.5	83.7	72.7	45.2	26.6	20.0	15.9	11.3	6.7	3.5	2.0

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 35%	Sound Lithotypes 65%
chert 8; schist 5; mafic intrusive 3; mafic extrusive 3; slate 3; weathered 3; felsic intrusive 2; sandstone 2; shale 2; metasedimentary 2; felsic extrusive 1; siltstone 1	mafic extrusive 12; felsic intrusive 11; mafic intrusive 11; quartzite 9; felsic extrusive 8; gneiss 5; argillite 2; hornfels 2; sandstone 1; siltstone 1; greywacke 1; metavolcanic 1; metasedimentary 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
10	8	5	400 000

LOCATION:	H11-14	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact (?)	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Waterford
STATUS:	Inactive	**UTM:**	177 589

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Soil developed on the underlying material; silty beds are locally present at the surface.

1.5 m Sandy and Sandy Gravel: Predominantly well-sorted fine to medium sand, with interbeds of sandy gravel (up to 0.3 m thick) in the upper third, and of medium to very coarse sand with minor very fine gravel in the lower two-thirds; some coal fragments are present; clasts are subrounded to rounded, and are clean to lightly silt covered; the unit is trough cross-bedded; paleoflow direction was northeastward.

2.1 m Slump Covered: Assumed to be material as above.

A small subsidiary lift lies 2.2 m below the base of the above lift. The material at this level appears to be all sand. Large clasts are almost nonexistent in the pit area. Maximum clast size is 0.15 m.

This deposit has a ridge-like form, suggestive of an ice-contact origin. However, it could also have been formed by the erosion of an outwash or alluvial fan or delta.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	100.0	96.9	95.7	94.5	92.8	88.6	76.9	60.8	27.7	5.9	2.2

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 29%	Sound Lithotypes 71%
sandstone 17; chert 4; felsic intrusive 3; felsic extrusive 1; mafic extrusive 1; conglomerate 1; shale 1; schist 1	sandstone 16; felsic extrusive 15; felsic intrusive 9; mafic extrusive 9; quartzite 6; metasedimentary 5; metavolcanic 3; conglomerate 2; siltstone 2; mafic intrusive 1; greywacke 1; argillite 1; gneiss 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
4	2	5	100 000

LOCATION:	H11-15	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact (kame moraine)	**COUNTY:**	Kings
EXPOSURE TYPE:	Road cut	**PARISH:**	Waterford
STATUS:	Undeveloped	**UTM:**	187 578

SECTION DESCRIPTION & COMMENTS:

Crest Section (approximately 30 m above road level)

0.5 m Soil: Slightly silty soil, developed on the underlying material.

1.0 m Gravel and Gravelly Sand: Very fine to coarse gravel, with interbeds of gravelly coarse to very coarse sand; Sample A was obtained from this level.

Midslope Section (approximately 15 m above road level)

1.5 m Sand and Gravel: A sequence of cross-beds, each approximately 0.2 m thick, consisting of fine to medium gravel fining downward into medium to coarse sand; the bedding dips eastward; Sample B was obtained from this level.

Toe Section (above road level, approximately 30 m south of above sections)

0.7 m Soil: Silty soil, developed on the underlying material.

0.8 m Gravel and Gravelly Sand: Medium to very coarse gravel containing a few cobbles and boulders, with interbeds of gravelly medium to very coarse sand; Sample C was obtained from this level.

3.0 m Slump Covered: Assumed to be material as above; bedrock outcrops in the stream bed, approximately 7 m below road level; sand and gravel may extend down to this level.

(CONTINUED)

MECHANICAL ANALYSIS:

sieve		50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass	A	95.6	89.6	82.9	64.9	45.5	25.5	15.4	11.1	8.2	6.1	4.5
	B	100.0	93.6	91.3	75.8	53.5	34.7	20.0	9.4	4.1	2.5	1.9
	C	88.4	63.9	54.0	36.6	28.6	21.7	14.7	9.6	6.7	5.0	3.8

LITHOLOGIC ANALYSIS: Sample B

Unsound Lithotypes 24%	Sound Lithotypes 76%
sandstone 8; siltstone 5; chert 4; conglomerate 2; schist 2; weathered 2; felsic extrusive 1	felsic extrusive 19; mafic extrusive 19; felsic intrusive 9; sandstone 9; mafic intrusive 4; quartzite 4; limestone 3; metavolcanic 3; siltstone 2; gneiss 2; conglomerate 1; metasedimentary 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
180	100	5	5.0 million

LOCATION #: H11-15 **(cont'd)**

Clasts from the above sections are predominantly subangular to subrounded. Despite a maximum clast size of 0.4 m, clasts larger than 0.1 m are very few in number.

This deposit appears to be an arcuate kame moraine that marks the position of the ice margin associated with most of the outwash deposits extending southward into the Big Salmon River valley. This outwash is intimately associated with eskers and other types of ice-contact deposits, forming an extensive glaciofluvial complex. Good aggregate would be easily extractable throughout most of this area.

The reserve estimate pertains to that portion of the glaciofluvial complex to the north of the Madden Flats. The materials in this area are predominantly sandy to cobbly gravels. Locally, areas of sand, some with silty clay bands, may have formed in small lakes. To the north of H11-16, bedrock outcrops occur along the road and Trout Brook. However, up to 40 m of stratified sand and gravel has been observed to overlie the bedrock.

LITHOLOGIC ANALYSIS: Sample C

Unsound Lithotypes 33%	Sound Lithotypes 67%
mafic extrusive 8; weathered 6; sandstone 5; chert 5; felsic extrusive 2; shale 2; metavolcanic 2; felsic intrusive 1; conglomerate 1; siltstone 1	mafic extrusive 21; quartzite 11; felsic intrusive 7; felsic extrusive 7; metavolcanic 7; sandstone 4; metasedimentary 4; hornfels 2; greywacke 1; limestone 1; gneiss 1; quartz 1

LOCATION:	H11-16	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Glaciofluvial outwash	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Waterford
STATUS:	Inactive	**UTM:**	181 562

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

2.1 m Sandy Gravel: Cross-bedded very fine to coarse gravel and medium to very coarse sand, with a few cobbles and small boulders; minor interbeds of gritty fine to medium sand are present; clasts are subangular to subrounded, with light silt coatings; bedding dips southward.

5.9 m Slump Covered: Sand and gravel; local exposures at this level exhibit material varying from sand through to cobbly gravel; however, the overall pit average is probably similar to the material described above.

The largest clast in the pit area is a block 1.4 m across. This is extreme; the next largest is 0.5 m. However, the overall content of large clasts is low, estimated at less than 1%.

The reserve estimate applies only to that area around H11-16 that is mapped as outwash.

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.		82.7	78.2	54.1	36.1	21.5	14.3	7.1	3.0	1.6	1.1

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 16%	Sound Lithotypes 84%
mafic extrusive 9; felsic extrusive 2; mafic intrusive 2; schist 2; weathered 1	felsic extrusive 48; mafic extrusive 30; mafic intrusive 2; gneiss 2; felsic intrusive 1; metasedimentary 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
11	6	5	300 000

LOCATION:	H11-17	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact (esker)	**COUNTY:**	Kings
EXPOSURE TYPE:	Roadside excavation	**PARISH:**	Waterford
STATUS:	Undeveloped	**UTM:**	206 566

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

1.3 m Slump Covered: Appears to be material similar to that below.

1.2 m Sandy Gravel: Subhorizontally stratified very fine to very coarse gravel and fine to very coarse sand, locally silty, with a few cobbles; a few 5 cm thick beds of openwork gravel are also present; clasts are subangular to subrounded, with moderate to heavy silt coatings; maximum clast size is 0.4 m; the content of clasts greater than 0.1 m in size is estimated at 1 to 2%.

2.5 m Slump Covered: Assumed to be material as above.

This esker segment is tiny; approximately 80 m long and 15 m wide. Bedrock outcrops immediately to the west. The material in this segment is probably representative of that in the longer, unexposed, esker in the valley to the east of Cripps Hill.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	97.2	80.2	73.9	55.8	41.9	29.8	21.2	13.3	9.2	7.2	5.9

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 14%	Sound Lithotypes 86%
mafic extrusive 4; slate 3; weathered 3; felsic intrusive 1; mafic intrusive 1; sandstone 1; schist 1	felsic extrusive 16; metasedimentary 15; quartzite 14; felsic intrusive 13; mafic extrusive 12; siltstone 6; metavolcanic 6; sandstone 2; mafic intrusive 1; argillite 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			limited

LOCATION:	Hll-18	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact (esker)	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Waterford
STATUS:	Abandoned	**UTM:**	185 543

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

0.8 m Sandy Gravel: Poorly sorted very fine to very coarse gravel and medium to very coarse sand, with a few cobbles; contains an 0.3 m thick bed of gravelly medium to very coarse sand; clasts are subangular to rounded, with very light to light silt coatings.

1.9 m Slump Covered: Assumed to be material as above.

The above section is in the flank of the esker. Maximum section height is approximately 6 m. The material at the crest appears to be similar to that described above, but coarser (i.e., coarser gravel and more cobbles). Maximum clast size in the pit area is 0.3 m. Clasts larger than 0.1 m are estimated to comprise approximately 1% of the material.

Reserves are calculated for that portion of the Big Salmon River glaciofluvial complex extending from the Madden Flats south to the south end of Walton Lake on the east of the river, and to about 1 km south of Cardigan Lake on the west of the river. As in the area to the north (cf. Hll-15), most of the material is sandy to cobbly gravel. The higher, ice-contact, areas would be the best targets for aggregate extraction operations.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	94.8	82.9	75.7	56.0	43.3	29.6	17.3	6.2	3.4	2.8	2.2

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 42%	Sound Lithotypes 58%
sandstone 9; metasedimentary 8; chert 6; metavolcanic 4; conglomerate 3; weathered 3; felsic intrusive 2; shale 2; schist 2; mafic extrusive 1; siltstone 1; slate 1	quartzite 15; metasedimentary 13; metavolcanic 12; mafic extrusive 6; sandstone 4; felsic intrusive 3; felsic extrusive 2; mafic intrusive 1; greywacke 1; gneiss 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
220	150	3	4.5 million

LOCATION:	H11-19	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact (esker)	**COUNTY:**	Kings
EXPOSURE TYPE:	Road cut	**PARISH:**	Hammond
STATUS:	Undeveloped	**UTM:**	192 522

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

1.0 m Gravel: Poorly sorted fine to very coarse gravel, with a matrix of very fine to very coarse sand, locally silty, and with a few cobbles and small boulders; openwork lenses of cobbles, and of very fine to fine pea gravel are locally present; Sample A was obtained from this unit.

0.9 m Sand and Gravel: Interbedded gravelly fine to coarse sand and sandy very fine to very coarse gravel, with a few beds of silty very fine to fine sand; the lower 0.2 m is cobbly, and may be the top of a thick unit of sandy gravel; bedding is subhorizontal; Sample B was obtained from this unit.

5.3 m Slump Covered: Assumed to be sand or gravel.

Clasts in the upper unit are subangular to subrounded; in the lower unit they are subrounded to rounded. They have light to moderate silt coatings. Maximum clast size in the section is 0.4 m. The content of clasts exceeding 0.1 m in size is estimated at 1 to 2%.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% A pass.	75.6	53.9	48.9	36.2	27.3	19.9	15.4	11.5	8.7	6.4	4.9
B		90.9	89.7	81.9	72.0	57.5	44.4	30.5	19.8	12.1	7.8

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 26%	Sound Lithotypes 74%
felsic intrusive 6; chert 4; metasedimentary 4; shale 3; slate 3; metavolcanic 2; weathered 2; felsic extrusive 1; siltstone 1	felsic intrusive 16; quartzite 12; felsic extrusive 11; mafic extrusive 11; metasedimentary 9; metavolcanic 7; greywacke 3; hornfels 2; mafic intrusive 1; conglomerate 1; argillite 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			see H11-20

LOCATION:	H11-20	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Glaciofluvial outwash	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Hammond
STATUS:	Abandoned	**UTM:**	192 520

SECTION DESCRIPTION & COMMENTS:

0.7 m Soil: Slightly silty hardpan soil, developed on the underlying material.

0.6 m Cobbly Gravel: Poorly sorted, cobbly very fine to very coarse gravel, with a number of small boulders; the matrix consists of medium to very coarse sand; clasts are subrounded to rounded, with light to moderate silt coatings; the upper 0.5 m of the unit is oxidized due to its very high porosity.

1.8 m Slump Covered: Assumed to be material as above.

Maximum clast size in the pit area is 0.4 m. Clasts exceeding 0.1 m in size are estimated to comprise 5 to 10% of the material.

The material above appears to be similar to most of the outwash in the upper part of the valley. It seems to be much coarser than most of the ice-contact material, and much cleaner (cf. H11-19).

Reserves are calculated for that portion of the Big Salmon River glaciofluvial complex lying to the east of the river between Walton and Wilkins lakes, and to the west of the area within 0.85 km of site H11-21. As elsewhere in the complex, the material is primarily sandy to cobbly gravel.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	67.0	49.4	46.8	34.8	25.0	15.0	8.4	3.4	1.5	1.0	0.8

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 34%	Sound Lithotypes 66%
shale 6; felsic intrusive 4; mafic extrusive 4; siltstone 4; slate 4; felsic extrusive 2; conglomerate 2; sandstone 2; chert 2; metasedimentary 2; weathered 2	felsic extrusive 12; quartzite 12; felsic intrusive 10; metasedimentary 8; mafic extrusive 6; siltstone 6; metavolcanic 4; mafic intrusive 2; sandstone 2; greywacke 2; limestone 2

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
340	250	3	7.5 million

LOCATION:	H11-21	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Kings
EXPOSURE TYPE:	Trench	**PARISH:**	Hammond
STATUS:	Undeveloped	**UTM:**	206 524

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

1.2 m Sandy Gravel: Subhorizontally stratified fine to coarse gravel and fine to very coarse sand, with a few cobbles; minor beds of openwork very fine to medium gravel, and of gritty fine to medium sand, are also present; clasts are subangular to subrounded, with light to moderate silt coatings; maximum clast size is 0.3 m; clasts exceeding 0.1 m in size are estimated to comprise less than 1% of the unit.

3.4 m Slump Covered: Assumed to be material as above.

This section is in a ridge in an area of hummocky ice-contact deposits with associated outwash. Reserves are estimated for the area to the east of a curved line with a radius of 0.85 km from this site. Exposures are few within this area. However, the material appears to be predominantly sandy to cobbly gravel, as elsewhere in the glaciofluvial complex.

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.		82.8	77.2	55.8	41.7	29.3	22.9	15.3	7.3	2.1	1.0

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 31%	Sound Lithotypes 69%
metavolcanic 7; sandstone 4; shale 4; weathered 4; mafic extrusive 3; felsic extrusive 2; metasedimentary 2; felsic intrusive 1; mafic intrusive 1; siltstone 1; schist 1; slate 1	metasedimentary 13; quartzite 13; felsic extrusive 10; metavolcanic 9; hornfels 7; felsic intrusive 6; mafic extrusive 5; mafic intrusive 2; sandstone 1; siltstone 1; greywacke 1; argillite 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
150	70	2	1.4 million

LOCATION:	H11-22	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Glaciofluvial outwash	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Hammond
STATUS:	Inactive	**UTM:**	197 508

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil: Slightly silty soil, developed on the underlying material; 0.3 m has been removed at this site.

1.5 m Gravel: Interbedded cobbly fine to very coarse gravel with a matrix of medium to very coarse sand, and openwork fine to coarse gravel; clasts are predominantly subrounded, with light to moderate silt coatings; bedding dips eastward (possibly the west flank of a trough fill unit).

1.5 m Slump Covered: Assumed to be material as above.

0.9 m Sand and Silt: An auger hole at the base of the section intersected interbedded very fine to fine sand, silty very fine sand, and sandy silt; till appeared to be present at the base.

Maximum clast size in the pit area is 0.5 m. One to 3% of the material is estimated to consist of clasts greater than 0.1 m in size.

The eastern part of this pit extends into a small esker, exposing approximately 7 m of material. Maximum pit depth in the outwash is 4.5 m.

The pit across the road exposes similar, but slightly finer material.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	90.1	70.4	62.3	40.2	25.1	17.1	11.5	4.8	2.0	1.2	0.9

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 45%	Sound Lithotypes 55%
felsic intrusive 9; slate 6; felsic extrusive 5; shale 5; metavolcanic 5; weathered 4; siltstone 3; mafic extrusive 2; chert 2; metasedimentary 2; conglomerate 1; schist 1	felsic intrusive 13; metasedimentary 11; quartzite 10; felsic extrusive 6; mafic extrusive 5; siltstone 3; metavolcanic 3; mafic intrusive 1; greywacke 1; quartz 1; feldspar 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			see H11-20

LOCATION:	H11-23	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Glaciofluvial outwash	**COUNTY:**	Kings
EXPOSURE TYPE:	Trench	**PARISH:**	Hammond
STATUS:	Undeveloped	**UTM:**	191 481

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil: Slightly silty soil, developed on the underlying material.

0.9 m Sandy Gravel: Slightly cobbly medium to very coarse gravel and fine to very coarse sand, with a few boulders; clasts are predominantly subrounded, with moderate to heavy silt coatings; maximum clast size is 0.5 m; approximately 5% of the material is estimated to consist of clasts greater than 0.1 m in size; the unit appears to be massive.

1.0 m Slump Covered: Assumed to be material as above.

This site is considered to be representative of the material in the glaciofluvial complex to the west of the Big Salmon River and northeast of Crow Brook. Here, as elsewhere along these two streams, the material is primarily sandy to cobbly gravel.

Reserves are estimated in two parts: A) for the glaciofluvial complex area as described above; and B) for the belt of low-level outwash extending from the vicinity of H11-22 southward to H11-24.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	78.3	60.9	51.1	33.7	25.9	20.1	16.1	10.1	6.0	3.9	2.8

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 8%	Sound Lithotypes 92%
felsic extrusive 4; schist 2; sandstone 1; metavolcanic 1	felsic extrusive 32; mafic extrusive 23; metavolcanic 12; felsic intrusive 10; metasedimentary 9; gneiss 3; mafic intrusive 1; siltstone 1; quartzite 1

ESTIMATION OF RESERVES:

	Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
A	240	200	3	6.0 million
B	110	80	2	1.6 million

LOCATION:	H11-24	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Glaciofluvial outwash	**COUNTY:**	Saint John
EXPOSURE TYPE:	Hand-dug section	**PARISH:**	Saint Martins
STATUS:	Undeveloped	**UTM:**	186 459

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

0.4 m Sandy Gravel: Very fine to very coarse gravel and medium to very coarse sand, with a few cobbles; clasts are subrounded to rounded, with light silt coatings; maximum clast size is 0.3 m.

0.5 m Sand: Crudely stratified, clean medium to very coarse sand, with a few pebbles; at the base of this unit, there appears to be another gravelly unit.

The sample is a composite obtained from both of the above units. The test hole was dug in the side of a small kettle hole, formed by the melting out of a block of ice deposited with the sediment. A number of erratic boulders and blocks were also deposited in this area. The largest nearby is more than 5 m high. However, these appear to be surface features only.

Reserves are estimated for the area of glaciofluvial complex deposits south of the Shepody Road, southwest of Crow Brook, and west of the Big Salmon River. Most of the material in this area is sandy to cobbly gravel similar to that elsewhere in the Big Salmon River glaciofluvial complex, and coarser than that described in the section description above.

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.		87.8	84.7	71.1	62.2	53.0	35.1	9.6	2.2	1.3	1.0

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 12%	Sound Lithotypes 88%
sandstone 5; mafic extrusive 3; schist 2; metavolcanic 1; weathered 1	felsic extrusive 49; mafic extrusive 23; felsic intrusive 7; mafic intrusive 3; metavolcanic 2; sandstone 1; metasedimentary 1; gneiss 1; quartz 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
200	170	3	5.1 million

LOCATION:	H11-25	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact (esker)	**COUNTY:**	Saint John
EXPOSURE TYPE:	Road cut	**PARISH:**	Saint Martins
STATUS:	Undeveloped	**UTM:**	181 426

SECTION DESCRIPTION & COMMENTS:

North Side

0.6 m Soil: Silty soil, developed on the underlying material.

1.2 m Sandy Gravel: Poorly sorted, slightly cobbly sandy medium to very coarse gravel; in the upper 0.4 m the sand is silty, in places grading into sandy silt; in the lower 0.8 m the sand is fine to very coarse; clasts are subangular to subrounded, with heavy silt coatings; Sample A was obtained from the lower 0.8 m of this unit.

4.2 m Slump Covered: Assumed to be material as above; the base of the road cut is approximately 3.5 m above the base of the esker.

South Side

0.5 m Soil: Slightly silty soil, developed on the underlying material.

1.0 m Gravel: Subhorizontally stratified, clean very fine to very coarse gravel, with minor coarse to very coarse sand; Sample B was obtained from this unit.

0.2 m Sand: Clean fine to coarse sand.

0.1 m Sandy Gravel: Sandy gravel similar to Sample A.

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass. A	82.5	55.8	51.0	37.6	30.5	25.0	21.5	17.3	10.9	5.7	4.0
B		77.4	68.0	44.3	24.4	10.7	4.9	2.6	1.8	1.6	1.5

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 36%	Sound Lithotypes 64%
felsic intrusive 12; felsic extrusive 9; metasedimentary 6; gneiss 4; schist 2; weathered 2; mafic extrusive 1	felsic extrusive 24; felsic intrusive 13; metasedimentary 9; mafic extrusive 8; quartzite 6; gneiss 3; siltstone 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
165	140	3	4.2 million

LOCATION #: H11-25 **(cont'd)**

1.8 m Slump Covered: Assumed to be material as above.

Maximum clast size in the road cuts is 0.6 m. Two to five per cent of the material is estimated to consist of clasts exceeding 0.1 m in size.

Reserves are estimated for the glaciofluvial complex deposits to the east of the Big Salmon River, south of its confluence with Crow Brook. As elsewhere in the complex, the material exposed is primarily sandy to cobbly gravel.

LOCATION:	H11-26	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact (esker)	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Cardwell
STATUS:	Abandoned	**UTM:**	227 678

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

0.5 m Cobbly Sandy Gravel: Very poorly sorted, very fine to very coarse gravel and fine to very coarse sand, with a few boulders; clasts are subangular to subrounded, with light to moderate silt coatings; the unit appears massive.

0.7 m Slump Covered: Assumed to be material as above.

Another section, in a higher part of the esker, approximately 5 m from that above, exposed sandy gravel overlying dense reddish brown sandy till, probably a lens of flow till. Maximum section height is approximately 4 m.

Maximum clast size in the pit area is 0.6 m. An estimated 5% of the material consists of clasts larger than 0.1 m.

This small esker is flanked by outwash deposits of sandy gravel. Most of the deposit area is sterilized by housing developments and the highway, leaving only a limited volume of workable material.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	79.3	61.4	53.4	41.3	33.1	25.1	17.6	11.0	6.5	4.0	2.7

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 48%	Sound Lithotypes 52%
felsic intrusive 13; mafic extrusive 6; felsic extrusive 5; sandstone 5; shale 5; weathered 4; chert 3; schist 3; slate 3; metavolcanic 1	felsic intrusive 15; felsic extrusive 8; mafic intrusive 7; mafic extrusive 7; hornfels 4; quartzite 3; sandstone 2; metasedimentary 2; siltstone 1; metavolcanic 1; gneiss 1; quartz 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			limited

LOCATION:	H11-27	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Cardwell
STATUS:	Active-on-demand	**UTM:**	292 640

SECTION DESCRIPTION & COMMENTS:

West Side of Face

0.7 m Soil: Slightly silty soil, developed on the underlying material.

0.9 m Cobbly Gravel: Subhorizontally stratified, cobbly medium to very coarse gravel, with a few boulders, and a matrix of medium sand to very fine gravel; clasts are angular to subangular, with light to moderate silt coatings.

0.1 m Sand: Clean medium to very coarse sand.

0.3 m Gravel: Openwork very fine to coarse gravel.

2.5 m Slump Covered: Assumed to be material similar to that above; an irregular granite surface forms the base of the pit.

Sample A is a composite from the above section.

East Side of Face

0.6 m Soil: Slightly silty soil, developed on the underlying material.

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% A pass.	64.0	52.2	46.3	32.9	23.5	15.5	10.6	5.7	2.1	1.3	0.9
B		88.1	81.3	65.5	46.8	25.6	10.5	2.6	0.9	0.4	0.2

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 68%	Sound Lithotypes 32%
shale 19; felsic intrusive 13; slate 8; siltstone 6; mafic extrusive 5; sandstone 5; weathered 5; felsic extrusive 2; conglomerate 2; metasedimentary 2; schist 1	quartzite 8; metasedimentary 5; felsic intrusive 4; felsic extrusive 4; mafic extrusive 4; quartz 3; siltstone 2; metavolcanic 2

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
12	5	3	150 000

LOCATION #: H11-27 **(cont'd)**

1.4 m Sandy Gravel: Subhorizontally stratified very fine to coarse gravel and coarse to very coarse sand; Sample B was obtained from this unit.

0.9 m Slump Covered: Assumed to be material as above; the base of this section is wet.

Maximum clast size in the pit area is 0.7 m. Five to ten per cent of the material is estimated to consist of clasts larger than 0.1 m.

The western segment of this deposit, possibly an ice-contact fan, is largely sterilized by cottage development. The remaining workable reserves are considered to lie to the north of the current pit in the eastern segment.

LOCATION:	H11-28	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact (esker)	**COUNTY:**	Kings
EXPOSURE TYPE:	Road cut	**PARISH:**	Waterford
STATUS:	Undeveloped	**UTM:**	255 614

SECTION DESCRIPTION & COMMENTS:

0.7 m Soil: Slightly silty soil, developed on the underlying material.

0.5 m Sandy Gravel: Poorly sorted very fine to very coarse gravel and medium to very coarse sand, with a few cobbles; clasts are predominantly subrounded, with light to moderate silt coatings; maximum clast size is 0.4 m; less than 1% of the material appears to consist of material larger than 0.1 m in size.

0.3 m Slump Covered: Assumed to be material as above.

This section is in part of a large bifurcating esker system. The esker is approximately 9 m high at this point. Limited exposures suggest that most of the material in this deposit is similar to that sampled.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	90.4	69.9	60.6	44.1	33.3	23.8	16.0	7.4	3.2	1.4	0.7

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 23%	Sound Lithotypes 77%
metasedimentary 11; felsic extrusive 5; felsic intrusive 3; mafic extrusive 2; schist 1; weathered 1	felsic intrusive 26; mafic extrusive 18; felsic extrusive 12; metasedimentary 9; metavolcanic 5; quartzite 3; gneiss 2; mafic intrusive 1; quartz 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
75	60	4	2.4 million

LOCATION:	H11-29	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Waterford
STATUS:	Inactive	**UTM:**	284 616

SECTION DESCRIPTION & COMMENTS:

Section A

0.5 m Soil: Slightly silty soil, developed on the underlying material.

1.3 m Sandy Gravel: Poorly sorted very fine to very coarse gravel and medium to very coarse sand, fining downward, through very fine to medium gravel and medium to very coarse sand, to gravelly fine to coarse sand; approximately half of the unit is of the middle composition; the unit is a trough-fill, with coarser sandy gravel appearing again at its base; clasts are subrounded to rounded, with light to moderate silt coatings.

1.1 m Slump Covered: Assumed to be material as above.

Section B (approximately 5 m west of A)

0.5 m Soil: Slightly silty soil, developed on the underlying material.

1.8 m Silty Sand: Silty very fine to fine sand, with minor bands of coarser sand in the lower 0.7 m.

0.4 m Slump Covered: Assumed to be sand or gravel.

Maximum clast size in the pit area is 0.3 m. However, clasts larger than 0.1 m are rare.

This deposit is an area of hummocky ice-contact stratified drift of ill-defined extent. Limited exposures suggest that most of the material is sandy to cobbly gravel.

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	A	88.2	82.6	68.0	53.6	36.7	21.7	10.0	4.1	2.0	1.3
	B				100.0	99.3	98.8	95.9	85.1	46.4	15.7

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 49%	Sound Lithotypes 51%
felsic intrusive 15; slate 6; sandstone 5; shale 5; metasedimentary 4; felsic extrusive 3; conglomerate 3; siltstone 3; weathered 2; mafic extrusive 1; chert 1; schist 1	felsic intrusive 20; quartzite 7; felsic extrusive 4; mafic extrusive 4; metasedimentary 3; mafic intrusive 2; sandstone 2; greywacke 2; metavolcanic 2; hornfels 2; siltstone 1; gneiss 1; quartz 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
23	20	1.5	300 000

LOCATION:	H11-30	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Kings
EXPOSURE TYPE:	Road cut	**PARISH:**	Waterford
STATUS:	Undeveloped	**UTM:**	308 595

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil Slightly silty soil, developed on the underlying material; partially removed (thickness estimated).

1.1 m Cobbly Sandy Gravel: Very poorly sorted, cobbly very fine to very coarse gravel and fine to very coarse sand, with a few boulders; contains minor thin beds (less than 10 cm thick) of clean, well-sorted medium sand; clasts are subrounded, with light to moderate silt coatings; maximum clast size is 0.4 m; 10 to 20% of the material is estimated to exceed 0.1 m in size.

This deposit comprises another area of hummocky ice-contact stratified drift of ill-defined extent. The deposit is coarse and cobbly along the logging road; however, to the south of the road it appears to be largely sandy. The abandoned pit along the highway (UTM 313 595) exposes up to 3.8 m of sandy gravel, possibly with till at the base. Some areas are silty.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	62.7	51.2	48.3	39.8	32.2	24.5	18.0	11.8	7.7	5.3	4.4

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 33%	Sound Lithotypes 67%
felsic intrusive 18; schist 6; shale 3; weathered 2; mafic intrusive 1; mafic extrusive 1; metavolcanic 1; slate 1	felsic intrusive 43; felsic extrusive 4; metasedimentary 4; metavolcanic 3; gneiss 3; quartzite 3; mafic intrusive 2; mafic extrusive 2; siltstone 2; argillite 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
45	30	2	600 000

LOCATION:	KH1-31	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact (esker)	**COUNTY:**	Kings
EXPOSURE TYPE:	Pit	**PARISH:**	Waterford
STATUS:	Inactive	**UTM:**	331 589

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil: Silty soil, developed in a silty sandy gravel.

0.6 m Sandy Gravel: Horizontally stratified medium to very coarse gravel and medium to coarse sand, with a few cobbles.

0.3 m Sand: Clean, gritty medium to coarse sand, with minor thin beds (1 to 2 cm thick) of coarse to very coarse sand; horizontally stratified.

0.6 m Sandy Gravel: Fine to very coarse gravel and coarse to very coarse sand, with a few cobbles.

6.4 m Slump Covered: Assumed to be material as above.

The sample is a composite from the above section. Clasts in this material are subrounded to rounded, with light to moderate silt coatings. Maximum clast size in the pit area is 0.6 m. Clasts exceeding 0.1 m in size are estimated to comprise about 1% of the material.

The above section is in an esker ridge with a maximum height of approximately 9 m. The esker is flanked by outwash of similar composition. Pit exposures in the outwash range from approximately 2 to 5 m in height. A bedrock ridge runs through the deposit, between the pit described above and the one to the east.

This deposit has been extensively worked, and is now nearing depletion.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	89.5	69.9	64.2	50.7	40.4	28.2	17.8	6.3	1.8	0.8	0.5

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 49%	Sound Lithotypes 51%
felsic intrusive 32; felsic extrusive 3; metavolcanic 3; weathered 3; mafic intrusive 2; conglomerate 2; sandstone 2; metasedimentary 1; schist 1	felsic intrusive 31; metasedimentary 5; metavolcanic 4; mafic intrusive 3; felsic extrusive 2; mafic extrusive 2; quartzite 2; gneiss 1; feldspar 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
32	5	4	200 000

LOCATION:	H11-32	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact (esker)	**COUNTY:**	Albert
EXPOSURE TYPE:	Road cut	**PARISH:**	Elgin
STATUS:	Undeveloped	**UTM:**	348 656

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil: Slightly silty soil, developed on the underlying material.

0.9 m Sandy Gravel: Poorly sorted very fine to very coarse gravel and fine to very coarse sand, with a few cobbles and boulders; clasts are subangular to subrounded, with light to moderate silt coatings; the unit appears to be massive.

1.6 m Slump Covered: Assumed to be material as above.

Maximum clast size in the road cut section is 0.6 m. Approximately 3% of the material is estimated to consist of clasts greater than 0.1 m in size.

Reserves in this tiny esker are very limited; probably only a few thousand cubic metres.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	84.5	65.6	61.7	50.0	40.8	32.2	25.9	19.5	12.7	6.9	3.6

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 51%	Sound Lithotypes 49%
felsic intrusive 38; schist 3; slate 3; weathered 3; felsic extrusive 1; conglomerate 1; sandstone 1; siltstone 1	felsic intrusive 25; metasedimentary 7; felsic extrusive 4; mafic extrusive 4; metavolcanic 3; mafic intrusive 1; siltstone 1; gneiss 1; quartzite 1; quartz 1; feldspar 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			limited

LOCATION:	H11-33	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact (esker)	**COUNTY:**	Albert
EXPOSURE TYPE:	Pit	**PARISH:**	Elgin
STATUS:	Abandoned	**UTM:**	357 680

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

0.7 m Sand: Gritty, very fine to fine sand, with a few pebbles.

1.7 m Gravel and Sandy Gravel: Subhorizontally stratified, interbedded openwork gravel and sandy gravel; the openwork gravel consists of very fine to very coarse gravel, with a few cobbles and boulders; the sandy gravel consists of similar gravel and medium to very coarse sand; clasts are subangular to subrounded, with light to moderate silt coatings.

3.3 m Slump Covered: Assumed to be material as above.

Maximum clast size in the pit area is 0.5 m. Clasts exceeding 0.1 m in size are estimated to comprise approximately 3% of the material.

This pit has been sampled by DOT (1973). The results of their tests are as follows:

Mechanical Analysis (7 samples)
34 to 50% passing 4.75 mm (average 40%)
1.3 to 4.6% passing 75 um (average 3.0%)

Los Angeles Abrasion Loss: 21.2 to 22.6% (average 21.8%)

(CONTINUED)

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.		73.9	65.4	46.7	32.5	22.3	14.4	7.2	4.7	3.5	2.5

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 28%	Sound Lithotypes 72%
felsic intrusive 11; metasedimentary 5; shale 3; felsic extrusive 2; sandstone 2; metavolcanic 2; schist 2; slate 1	felsic intrusive 40; felsic extrusive 6; quartzite 5; metavolcanic 4; mafic extrusive 3; metasedimentary 3; hornfels 3; mafic intrusive 2; sandstone 2; gneiss 2; greywacke 1; argillite 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			limited

LOCATION #: H11-33 (cont'd)

Recommended for use as borrow, subbase, and base-course aggregate.

This deposit is a small, narrow esker. Workable reserves are limited by the small size of the deposit and by the presence of a church on the part of the deposit to the south of the road.

LOCATION:	H11-34	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact (esker)	**COUNTY:**	Albert
EXPOSURE TYPE:	Road cut	**PARISH:**	Elgin
STATUS:	Undeveloped	**UTM:**	395 627

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil: Slightly silty soil, developed on the underlying material.

1.1 m Sandy Gravel: Subhorizontally stratified, very fine to very coarse gravel and medium to very coarse sand, with a few cobbles; clasts are subrounded to rounded, with light silt coatings; maximum clast size is 0.3 m; approximately 1% of the unit consists of clasts larger than 0.1 m in size.

0.7 m Slump Covered: Assumed to be material as above.

The esker is 9.5 m high at this point. There are few exposures in this deposit. However, the material that is exposed is highly variable, ranging from well-sorted medium sand through to cobble gravel. Similar material is present in the small esker ridge to the southeast of H11-34. A skidder cut through this ridge exposes 1.2 m of cobbly gravel over 0.2 m of dense silt, in turn over 0.2+ m of clean medium sand. The material exposed in the large deposit along Haslam Brook, to the southwest, is a gravelly sand. The materials in the esker segments along the Pollett River, to the north, are presumed to be similarly variable.

Reserves are calculated in five parts:

A) for the large deposit including H11-34;
B) for the 2 esker segments to the south of H11-34;
C) for the large deposit along Haslam Brook;

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	87.7	63.6	57.8	44.7	35.8	27.5	19.2	8.0	2.3	1.0	0.7

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 25%	Sound Lithotypes 75%
felsic intrusive 7; sandstone 6; siltstone 5; metavolcanic 3; felsic extrusive 1; mafic extrusive 1; conglomerate 1; weathered 1	felsic intrusive 43; metasedimentary 13; metavolcanic 8; sandstone 5; mafic intrusive 3; quartzite 2; quartz 1

ESTIMATION OF RESERVES:

	Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
A	33	30	4	1.2 million
B	4	4	4	160 000
C	20	13	1+	130 000+
D	7	5	4	200 000
E	8	6	4	240 000

LOCATION #: H11-34 **(cont'd)**

D) for the northernmost of the esker segments along Pollett River; and
E) for the esker segment between D and H11-34.

The other, smaller, esker segments in the area may contain limited volumes of material.

LOCATION:	H11-35	**NTS:**	21 H/11
TYPE OF DEPOSIT:	Ice-contact (esker)	**COUNTY:**	Albert
EXPOSURE TYPE:	Pit	**PARISH:**	Alma
STATUS:	Abandoned	**UTM:**	393 596

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil: Slightly silty soil, developed on the underlying material.

0.8 m Sandy Gravel: Crudely stratified, very fine to coarse gravel and medium to very coarse sand; a discontinuous cobble and boulder layer is present near the top of the unit; clasts are subangular to rounded, with light to moderate silt coatings.

4.4 m Slump Covered: Assumed to be material as above.

Maximum clast size in the pit area is 0.5 m. Clasts exceeding 0.1 m in size are estimated to comprise 1 to 2% of the material. This pit is within Fundy National Park. The material is presumed to be representative of the material in that small portion of the deposit to the north of the park boundary.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	91.7	80.2	76.3	59.6	44.4	30.5	15.0	4.6	2.4	2.0	1.9

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 26%	Sound Lithotypes 74%
felsic intrusive 11; schist 9; chert 3; metasedimentary 2; felsic extrusive 1	felsic intrusive 31; felsic extrusive 12; mafic extrusive 6; gneiss 6; quartzite 6; mafic intrusive 3; metasedimentary 3; quartz 3; sandstone 2; argillite 1; metavolcanic 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			limited

H11-101 UTM 074 642

This site is a pit area in the alluvial terrace along Trout Creek. The area has been extensively tested by DOT (1968, 1978). Their results were as follows:

Pit Run Material

Mechanical Analysis (20 samples)
15 to 62% passing 4.75 mm (average 34%)
0.4 to 2.1% passing 75 um (average 1.3%)

Los Angeles Abrasion Loss: 18.0 to 23.2% (average 20.2%)

Crushed Material

Mechanical Analysis
42% passing 4.75 mm; 2.6% passing 75 um

Absorption: stone 1.29%; sand 1.96%
Soundness Loss: stone 3.31%; sand 2.91%
Sand Equivalent: 69

Recommended for use as subbase, base, and asphaltic concrete aggregate and as surface treatment chips.

A site in this deposit approximate 1.5 km to the northwest, within the village of Sussex Corner, has also been tested by DOT (1978). The results of these tests were as follows:

Pit Run Material

Mechanical Analysis (8 samples)
33 to 66% passing 4.75 mm (average 45%)
0.7 to 8.5% passing 75 um (average 3.2%)

Los Angeles Abrasion Loss: 21.1 to 23.2% (average 21.9%)

Recommended for use as borrow, subbase, base, and asphaltic concrete aggregate.

Crushed Material

Mechanical Analysis
45% passing 4.75 mm; 2.2% passing 75 um

Absorption: stone 1.43%; sand 1.05%
Soundness Loss: stone 6.04%; sand 3.23%
Sand Equivalent: 81

Recommended for use as asphaltic concrete aggregate and as surface treatment chips.

Field observations indicate that most of the alluvial material along Trout Creek is similar to that described by the above DOT test results. The material to the north, near the Kennebecasis River tends to be finer, with a significant sand component.

Workable reserves in this deposit are limited by urban, industrial, and agricultural developments, and by a shallow water table.

H11-102 UTM 095 673

This site is an abandoned pit in the kame-and-kettle ice-contact complex south of the Kennebecasis River (see: H11-4 and -5). The material consists of a mixture of both fine and coarse aggregate. Dense silty till was observed at the base of the pit at one location. Bedrock has been reported in some DOT shallow test holes.

This pit area has been extensively tested by DOT (1968, 1969). The results of their tests were as follow:

Mechanical Analysis: coarse aggregate (7 samples)
43.4 to 63.3% passing 4.75 mm (average 51.5%)
3.0 to 18.0% passing 75 um (average 7.6%)

fine aggregate (11 samples)
80.9 to 100.0% passing 4.75 mm (average 94.1%)
5.6 to 23.6% passing 75 um (average 13.4%)

Los Angeles Abrasion Loss: 38.0 to 40.4% (average 39.5%)

Recommended for use as borrow; some of the coarse aggregate may be suitable for use as subbase material.

DOT (1959, 1968) test data for some of the abandoned pit areas immediately to the northeast suggest that the materials in these areas are similar to that described above. The results of these tests are as follow:

Mechanical Analysis: coarse aggregate (9 samples)
39.3 to 59.0% passing 4.75 mm (average 49.5%)
1.7 to 10.6% passing 75 um (average 5.5%)

fine aggregate (1 sample)
100.0% passing 4.75 mm; 21.9% passing 75 um

Los Angeles Abrasion Loss: 25.9 to 31.1% (average 29.0%)

Recommended for use as borrow; marginal for use as subbase.

This part of the kame-and-kettle complex has been intensively pitted. Remaining workable reserves are estimated to be in the order of 300 000 m^3. However, the southern boundary of the deposit in this area is indistinct, possibly because of burial by marine or lacustrine fine-grained sediments. Consequently, the extent of the deposit to the south could be greater than as mapped.

H11-103 UTM 147 684

This site is another pit area tested by DOT (1969, 1980). Their test results were as follows:

Mechanical Analysis (12 samples)
40 to 70% passing 4.75 mm (average 54%)
1.4 to 7.2% passing 75 um (average 3.6%)

Los Angeles Abrasion Loss: 33.9 to 40.0% (average 36.7%)

Recommended for use as borrow and subbase.

There are two pits in this immediate area. That closest to the road is abandoned, with no good faces remaining. A few remnants of crushed rock stockpiles are present. The other pit is active-on-demand, and exposes about 5 m of sandy gravel.

See H11-6 for further details concerning this deposit.

H11-104 UTM 171 597

This site is a road cut at the northern end of an area of rolling ice-contact topography. The deposit may have been formed in a small, ice-dammed lake as a subaqueous ice-contact deposit.

The road cut exposes up to 9 m of sand with interbeds of sandy gravel, silt, clay, and diamicton. Some deformation structures are present. The material appears to grade northward into till.

Most of the material exposed in this deposit is sand and gravelly sand. Workable reserves are estimated at 100 000 m^3.

H11-105 UTM 269 567

This site is a hand-dug section that exposes approximately 1 m of cobbly sandy gravel of apparent good quality. Similar material was observed in a few other shallow exposures in the deposit, on both sides of the Point Wolfe River. Workable reserves are estimated at 200 000 m^3.

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